Pantheon Report

Generated at 2017-09-19 02:57:17 (UTC).

Data path: GCE London Ethernet (*remote*) →GCE Iowa Ethernet (*local*).

Repeated the test of 10 congestion control schemes 10 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.
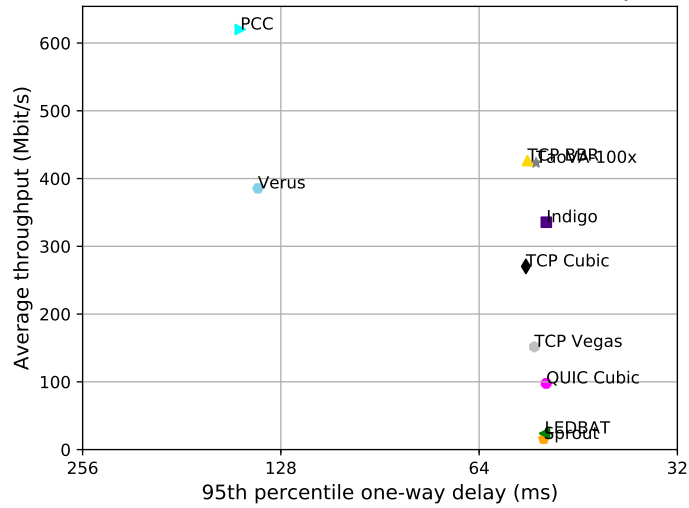
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

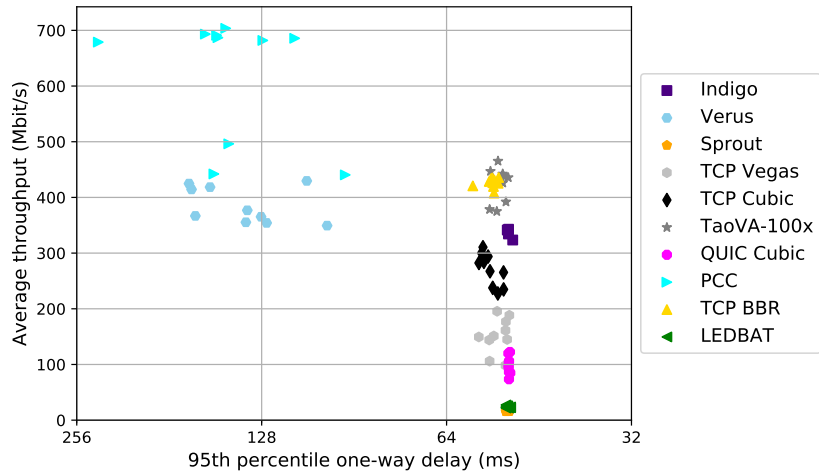Tested BBR with qdisc of Fair Queuing (`fq`), and other schemes with the default Linux qdisc (`pfifo_fast`).

```
Git summary:
branch: master @ 57453dc11f8da93a2e03eea75289fea01b816298
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/genericCC @ f7ca42f251bf49b432bb71de6d13fa903515c366
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
 M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from GCE London Ethernet to GCE Iowa Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)

test from GCE London Ethernet to GCE Iowa Ethernet, 10 runs of 30s each per scheme
3 flows with 10s interval between flows

2

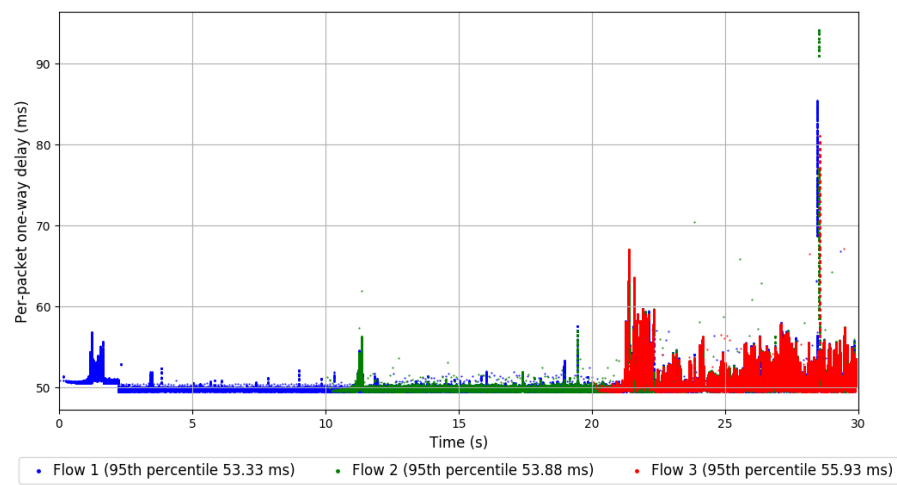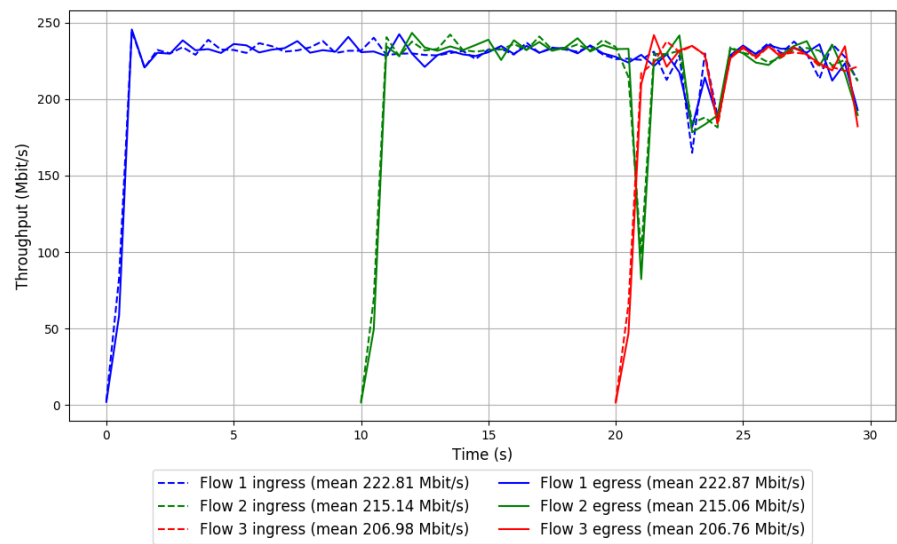| scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	10	214.80	215.49	207.68	53.23	54.06	55.38	0.38	0.47	1.14
TCP Cubic	10	147.07	130.63	110.91	54.12	53.96	54.42	0.34	0.68	1.25
Indigo	4	174.58	168.81	150.17	50.50	50.70	50.71	0.29	0.52	1.06
LEDBAT	10	11.83	14.46	7.48	50.88	50.94	50.81	0.73	0.77	1.71
PCC	10	483.52	174.15	64.10	148.57	137.67	123.99	1.78	2.01	2.33
QUIC Cubic	10	54.20	45.52	40.69	50.50	50.63	50.53	0.47	0.83	0.77
Sprout	10	7.97	7.89	7.60	51.09	51.00	50.80	0.41	0.58	1.10
TaoVA-100x	10	240.59	216.53	156.63	51.94	52.05	56.71	0.35	0.45	1.44
TCP Vegas	10	69.81	88.62	69.57	52.27	52.54	51.42	0.28	0.45	1.17
Verus	10	225.01	179.27	128.77	111.56	146.60	145.85	0.79	1.81	3.41

```
Run 1: Statistics of TCP BBR

Start at: 2017-09-18 22:38:30
End at: 2017-09-18 22:39:00


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 433.91 Mbit/s
95th percentile per-packet one-way delay: 54.165 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 222.87 Mbit/s
95th percentile per-packet one-way delay: 53.332 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 215.06 Mbit/s
95th percentile per-packet one-way delay: 53.879 ms
Loss rate: 0.55%
-- Flow 3:
Average throughput: 206.76 Mbit/s
95th percentile per-packet one-way delay: 55.928 ms
Loss rate: 1.13%
```

Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-09-18 22:47:44
End at: 2017-09-18 22:48:14


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 420.72 Mbit/s
95th percentile per-packet one-way delay: 58.002 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 211.12 Mbit/s
95th percentile per-packet one-way delay: 55.597 ms
Loss rate: 0.39%
-- Flow 2:
Average throughput: 213.98 Mbit/s
95th percentile per-packet one-way delay: 57.348 ms
Loss rate: 0.57%
-- Flow 3:
Average throughput: 204.50 Mbit/s
95th percentile per-packet one-way delay: 60.170 ms
Loss rate: 1.19%
```
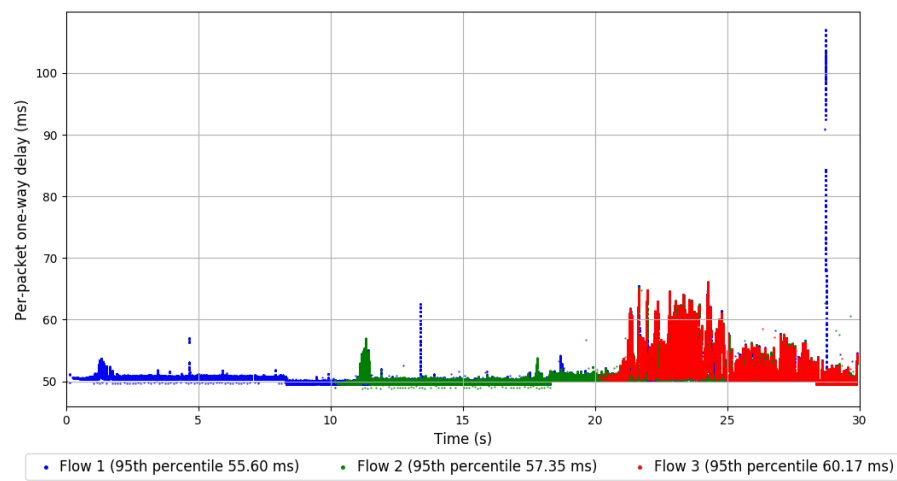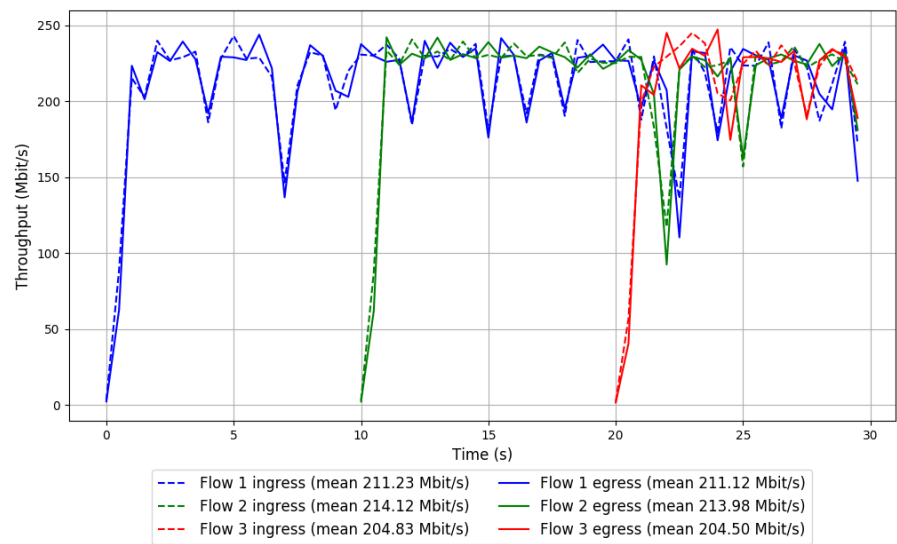
Run 2: Report of TCP BBR — Data Link

Flow 1 ingress (mean 211.23 Mbit/s) --- Flow 1 egress (mean 211.12 Mbit/s)
Flow 2 ingress (mean 214.12 Mbit/s) --- Flow 2 egress (mean 213.98 Mbit/s)
Flow 3 ingress (mean 204.83 Mbit/s) --- Flow 3 egress (mean 204.50 Mbit/s)

Flow 1 (95th percentile 55.60 ms)   Flow 2 (95th percentile 57.35 ms)   Flow 3 (95th percentile 60.17 ms)

7

```
Run 3: Statistics of TCP BBR

Start at: 2017-09-18 22:56:49
End at: 2017-09-18 22:57:19


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 428.68 Mbit/s
95th percentile per-packet one-way delay: 54.544 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 219.43 Mbit/s
95th percentile per-packet one-way delay: 53.551 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 215.10 Mbit/s
95th percentile per-packet one-way delay: 54.537 ms
Loss rate: 0.57%
-- Flow 3:
Average throughput: 201.13 Mbit/s
95th percentile per-packet one-way delay: 57.310 ms
Loss rate: 1.21%
```
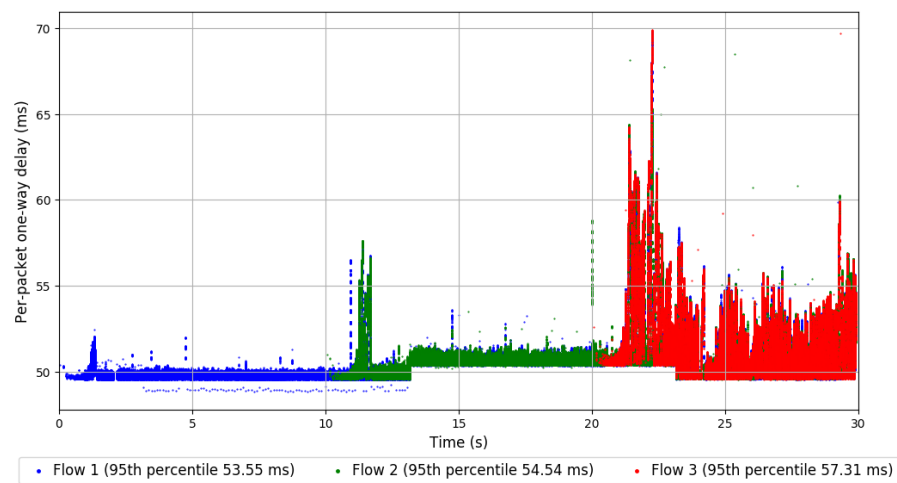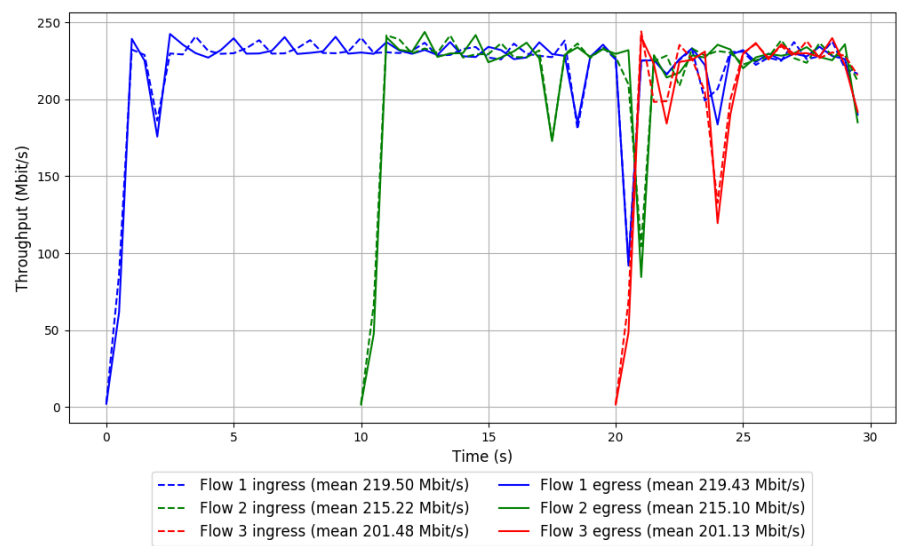
Run 3: Report of TCP BBR — Data Link

```
Run 4: Statistics of TCP BBR

Start at: 2017-09-18 23:06:10
End at: 2017-09-18 23:06:40

# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 431.45 Mbit/s
95th percentile per-packet one-way delay: 53.511 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 219.26 Mbit/s
95th percentile per-packet one-way delay: 52.813 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 215.74 Mbit/s
95th percentile per-packet one-way delay: 53.690 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 208.69 Mbit/s
95th percentile per-packet one-way delay: 54.465 ms
Loss rate: 1.17%
```
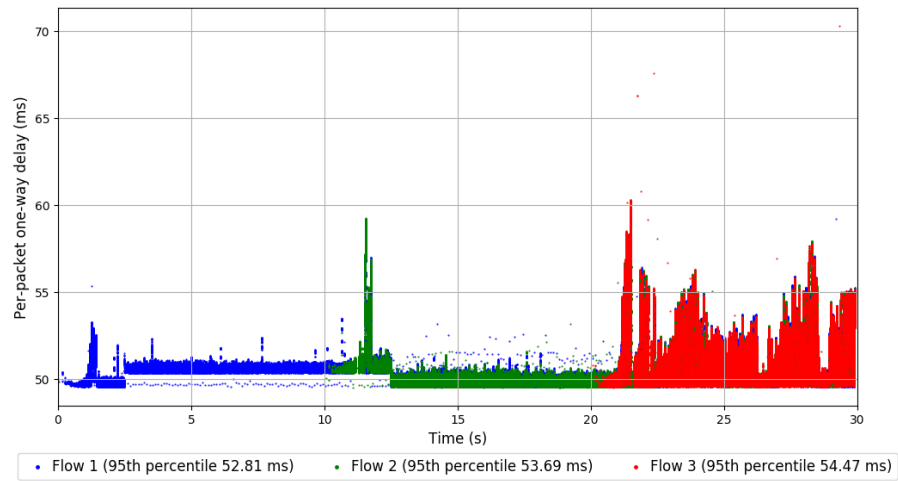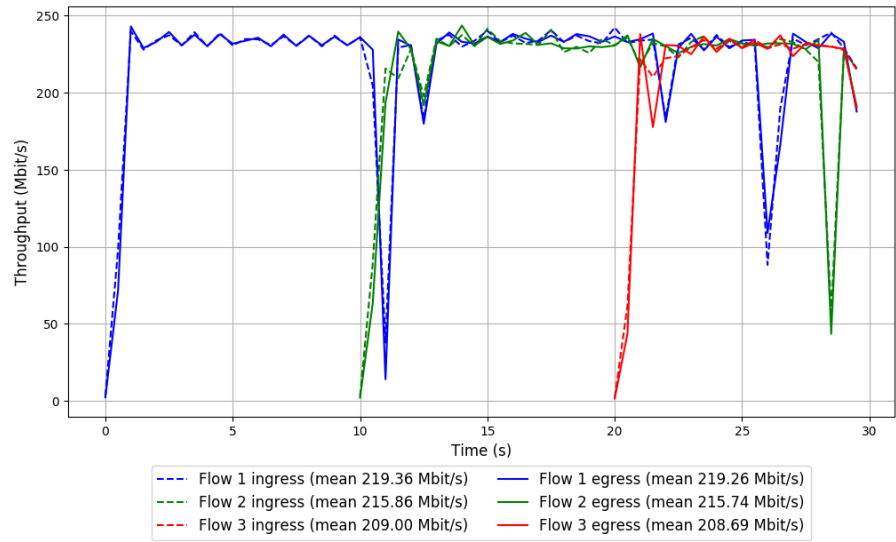
Run 4: Report of TCP BBR — Data Link

Flow 1 ingress (mean 219.36 Mbit/s) --- Flow 1 egress (mean 219.26 Mbit/s)
Flow 2 ingress (mean 215.86 Mbit/s) --- Flow 2 egress (mean 215.74 Mbit/s)
Flow 3 ingress (mean 209.00 Mbit/s) --- Flow 3 egress (mean 208.69 Mbit/s)

Flow 1 (95th percentile 52.81 ms)   Flow 2 (95th percentile 53.69 ms)   Flow 3 (95th percentile 54.47 ms)

11

```
Run 5: Statistics of TCP BBR

Start at: 2017-09-18 23:15:20
End at: 2017-09-18 23:15:50


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 426.36 Mbit/s
95th percentile per-packet one-way delay: 53.812 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 217.57 Mbit/s
95th percentile per-packet one-way delay: 52.909 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 214.71 Mbit/s
95th percentile per-packet one-way delay: 54.041 ms
Loss rate: 0.53%
-- Flow 3:
Average throughput: 200.40 Mbit/s
95th percentile per-packet one-way delay: 55.130 ms
Loss rate: 1.18%
```
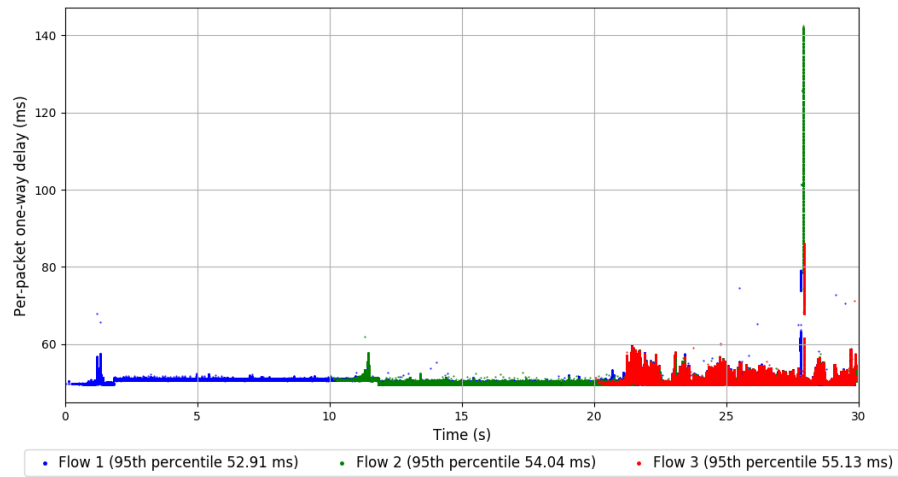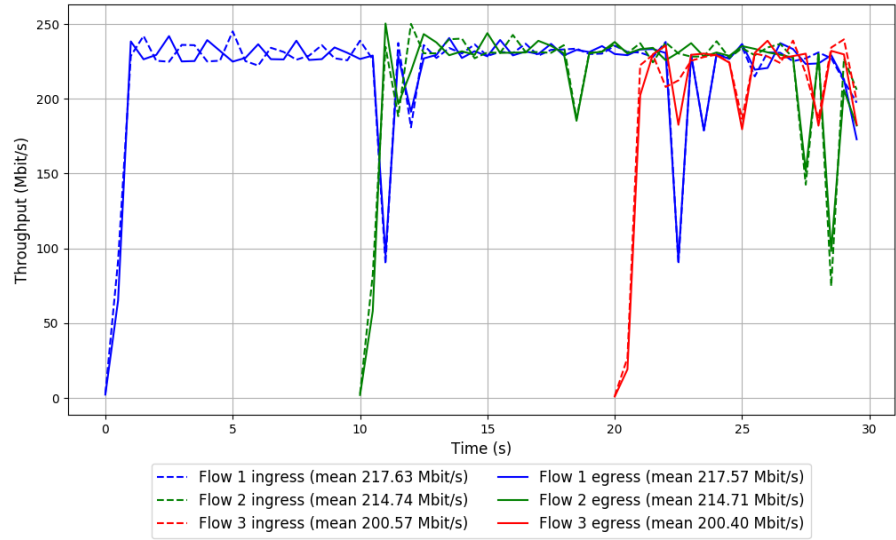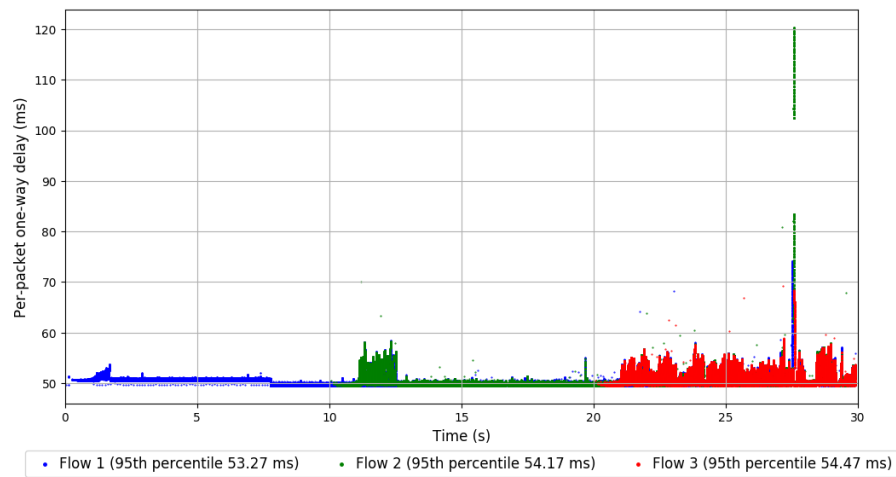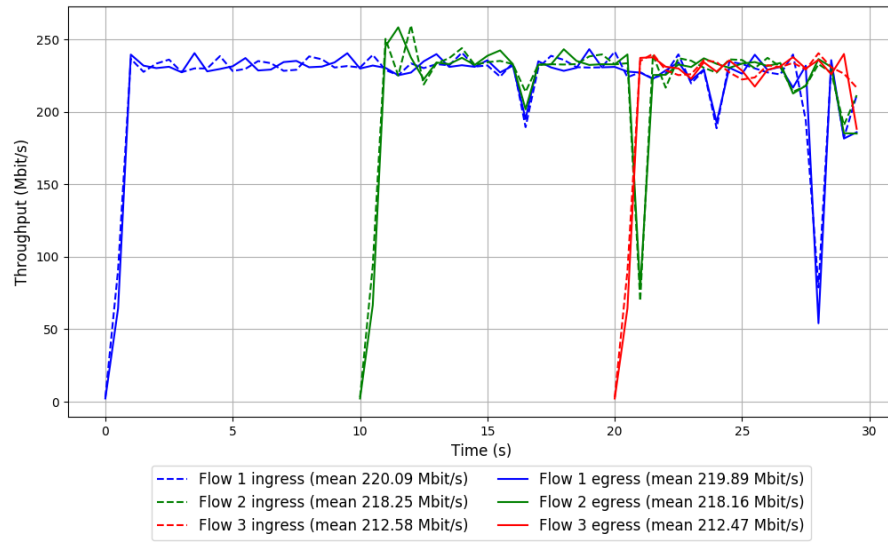
Run 5: Report of TCP BBR — Data Link

Flow 1 ingress (mean 217.63 Mbit/s)   Flow 1 egress (mean 217.57 Mbit/s)
Flow 2 ingress (mean 214.74 Mbit/s)   Flow 2 egress (mean 214.71 Mbit/s)
Flow 3 ingress (mean 200.57 Mbit/s)   Flow 3 egress (mean 200.40 Mbit/s)

Flow 1 (95th percentile 52.91 ms)   Flow 2 (95th percentile 54.04 ms)   Flow 3 (95th percentile 55.13 ms)

13

```
Run 6: Statistics of TCP BBR

Start at: 2017-09-18 23:24:34
End at: 2017-09-18 23:25:04


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 434.95 Mbit/s
95th percentile per-packet one-way delay: 53.909 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 219.89 Mbit/s
95th percentile per-packet one-way delay: 53.270 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 218.16 Mbit/s
95th percentile per-packet one-way delay: 54.174 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 212.47 Mbit/s
95th percentile per-packet one-way delay: 54.473 ms
Loss rate: 1.07%
```
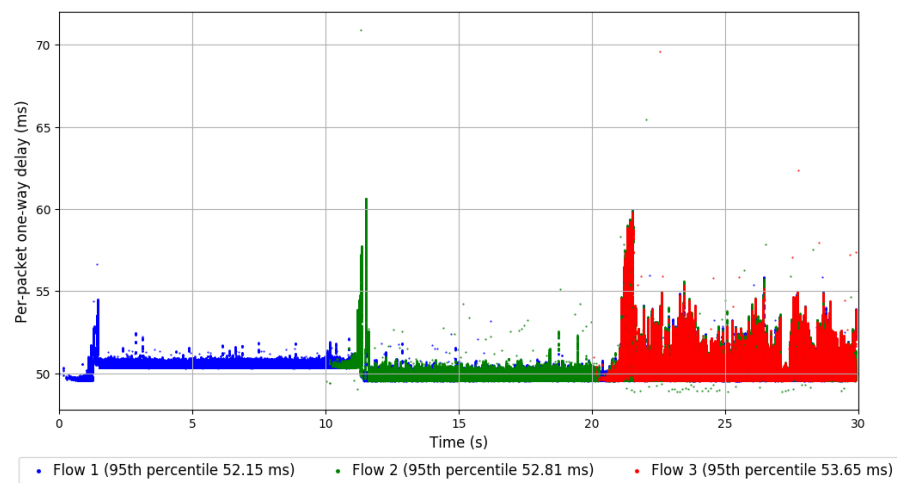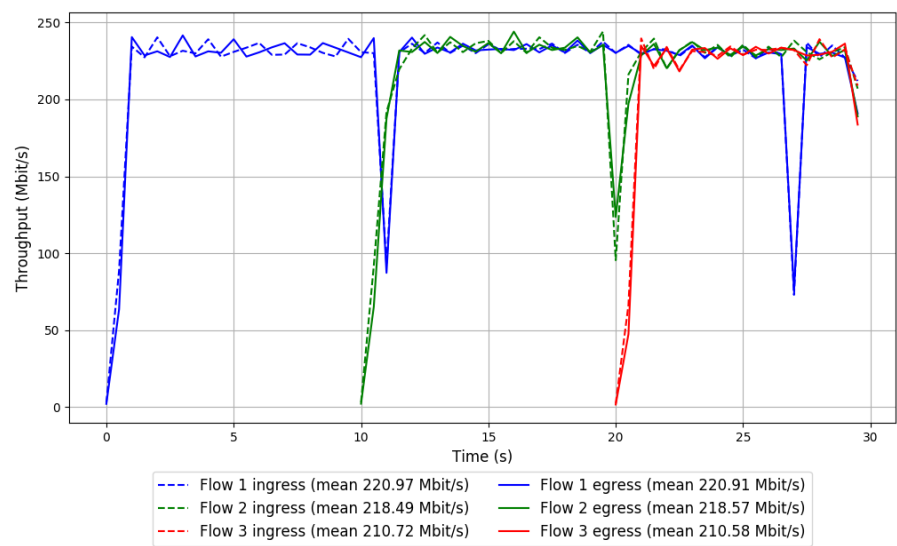
Run 6: Report of TCP BBR — Data Link

```
Run 7: Statistics of TCP BBR

Start at: 2017-09-18 23:33:51
End at: 2017-09-18 23:34:21


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 435.75 Mbit/s
95th percentile per-packet one-way delay: 52.642 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 220.91 Mbit/s
95th percentile per-packet one-way delay: 52.153 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 218.57 Mbit/s
95th percentile per-packet one-way delay: 52.806 ms
Loss rate: 0.48%
-- Flow 3:
Average throughput: 210.58 Mbit/s
95th percentile per-packet one-way delay: 53.650 ms
Loss rate: 1.10%
```
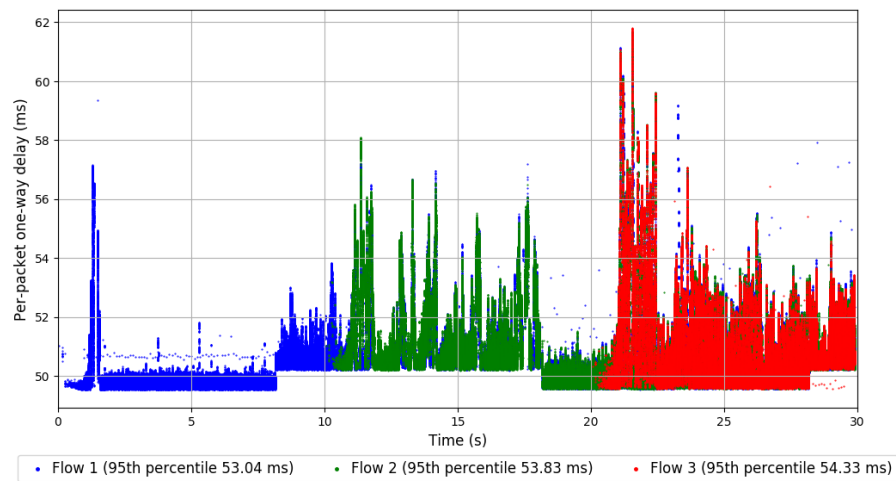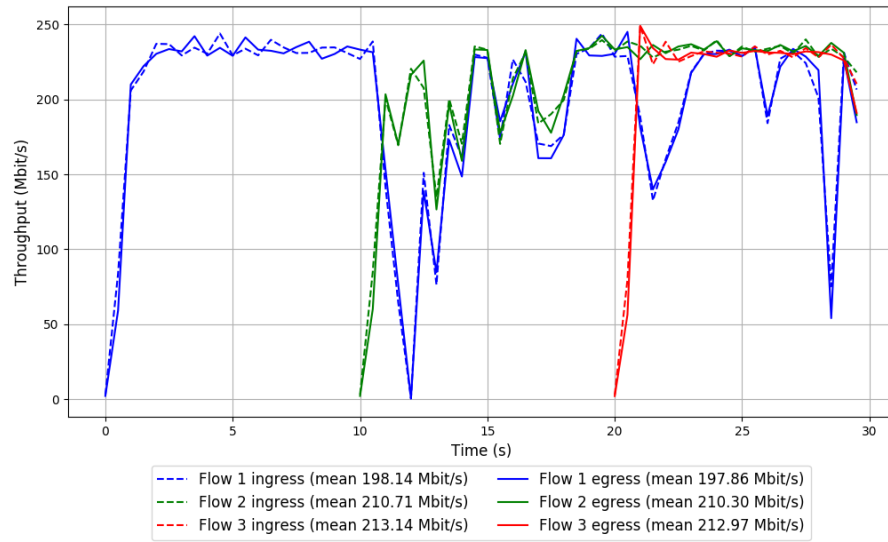
Run 7: Report of TCP BBR — Data Link

Flow 1 ingress (mean 220.97 Mbit/s)   Flow 1 egress (mean 220.91 Mbit/s)
Flow 2 ingress (mean 218.49 Mbit/s)   Flow 2 egress (mean 218.57 Mbit/s)
Flow 3 ingress (mean 210.72 Mbit/s)   Flow 3 egress (mean 210.58 Mbit/s)

Flow 1 (95th percentile 52.15 ms)   Flow 2 (95th percentile 52.81 ms)   Flow 3 (95th percentile 53.65 ms)

17

```
Run 8: Statistics of TCP BBR

Start at: 2017-09-18 23:43:04
End at: 2017-09-18 23:43:34


# Below is generated by plot.py at 2017-09-19 02:03:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 407.72 Mbit/s
95th percentile per-packet one-way delay: 53.564 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 197.86 Mbit/s
95th percentile per-packet one-way delay: 53.037 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 210.30 Mbit/s
95th percentile per-packet one-way delay: 53.825 ms
Loss rate: 0.71%
-- Flow 3:
Average throughput: 212.97 Mbit/s
95th percentile per-packet one-way delay: 54.330 ms
Loss rate: 1.14%
```
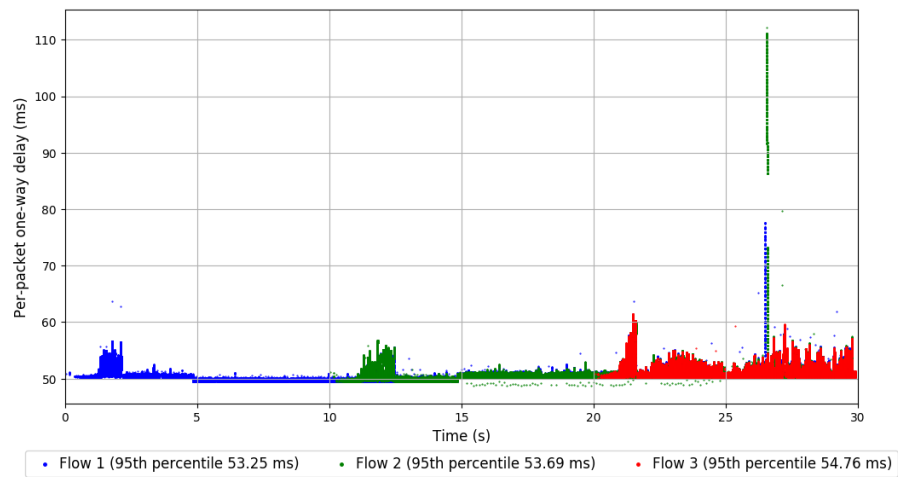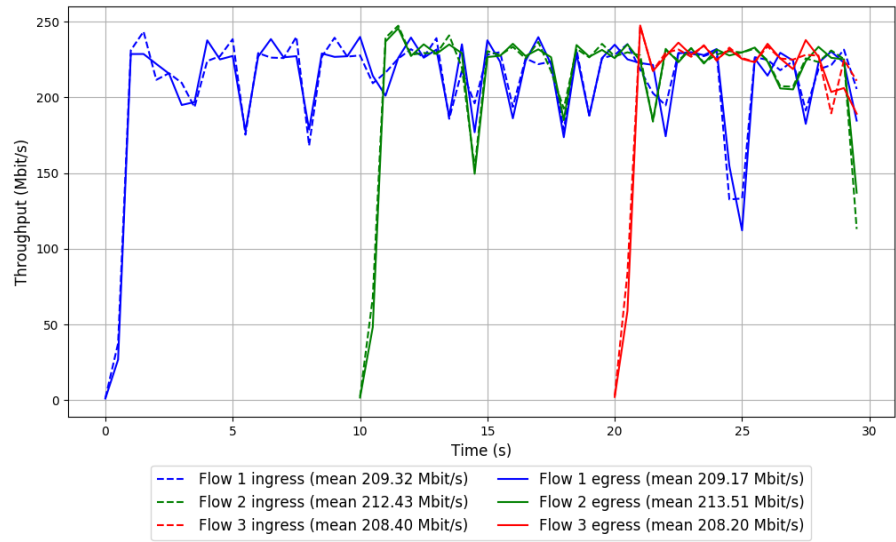
Run 8: Report of TCP BBR — Data Link

Flow 1 ingress (mean 198.14 Mbit/s) --- Flow 1 egress (mean 197.86 Mbit/s)
Flow 2 ingress (mean 210.71 Mbit/s) --- Flow 2 egress (mean 210.30 Mbit/s)
Flow 3 ingress (mean 213.14 Mbit/s) --- Flow 3 egress (mean 212.97 Mbit/s)

Flow 1 (95th percentile 53.04 ms)   Flow 2 (95th percentile 53.83 ms)   Flow 3 (95th percentile 54.33 ms)

19

```
Run 9: Statistics of TCP BBR

Start at: 2017-09-18 23:52:17
End at: 2017-09-18 23:52:47


# Below is generated by plot.py at 2017-09-19 02:10:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 419.69 Mbit/s
95th percentile per-packet one-way delay: 53.677 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 209.17 Mbit/s
95th percentile per-packet one-way delay: 53.248 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 213.51 Mbit/s
95th percentile per-packet one-way delay: 53.688 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 208.20 Mbit/s
95th percentile per-packet one-way delay: 54.758 ms
Loss rate: 1.11%
```
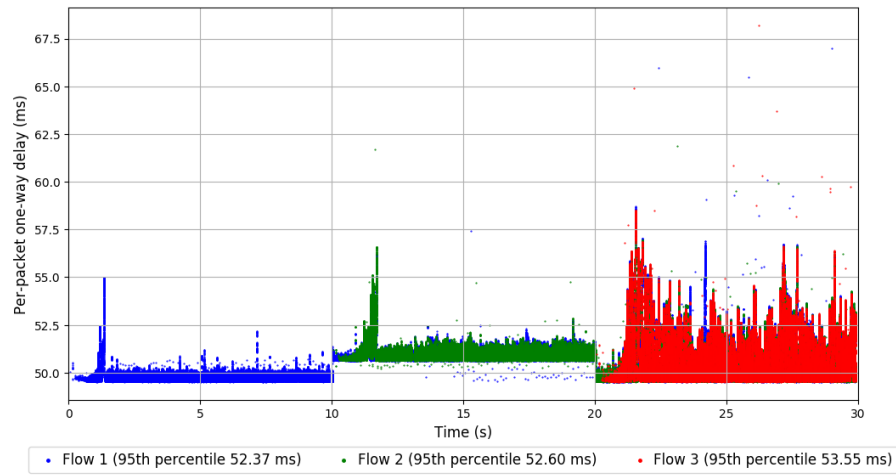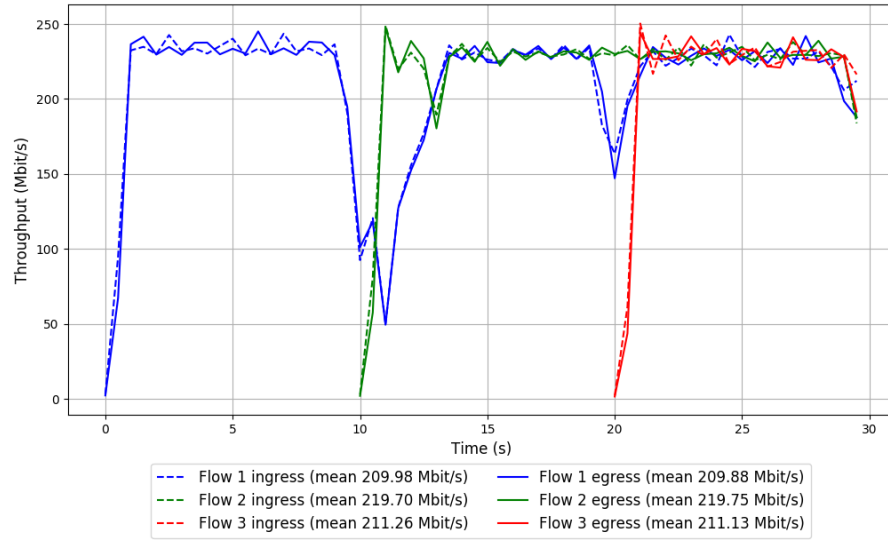
Run 9: Report of TCP BBR — Data Link

Flow 1 ingress (mean 209.32 Mbit/s) --- Flow 1 egress (mean 209.17 Mbit/s) ---
Flow 2 ingress (mean 212.43 Mbit/s) --- Flow 2 egress (mean 213.51 Mbit/s) ---
Flow 3 ingress (mean 208.40 Mbit/s) --- Flow 3 egress (mean 208.20 Mbit/s) ---

Flow 1 (95th percentile 53.25 ms)   Flow 2 (95th percentile 53.69 ms)   Flow 3 (95th percentile 54.76 ms)

21

```
Run 10: Statistics of TCP BBR

Start at: 2017-09-19 00:01:22
End at: 2017-09-19 00:01:52


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 425.43 Mbit/s
95th percentile per-packet one-way delay: 52.751 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 209.88 Mbit/s
95th percentile per-packet one-way delay: 52.368 ms
Loss rate: 0.39%
-- Flow 2:
Average throughput: 219.75 Mbit/s
95th percentile per-packet one-way delay: 52.602 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 211.13 Mbit/s
95th percentile per-packet one-way delay: 53.549 ms
Loss rate: 1.08%
```
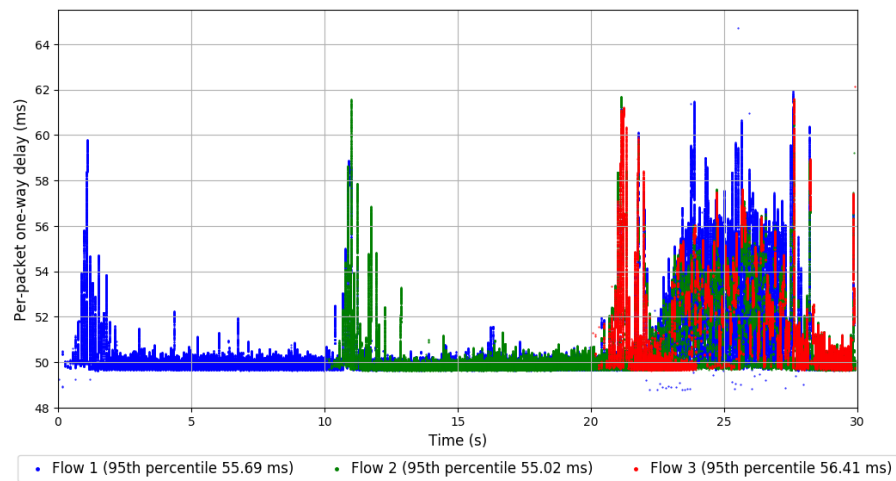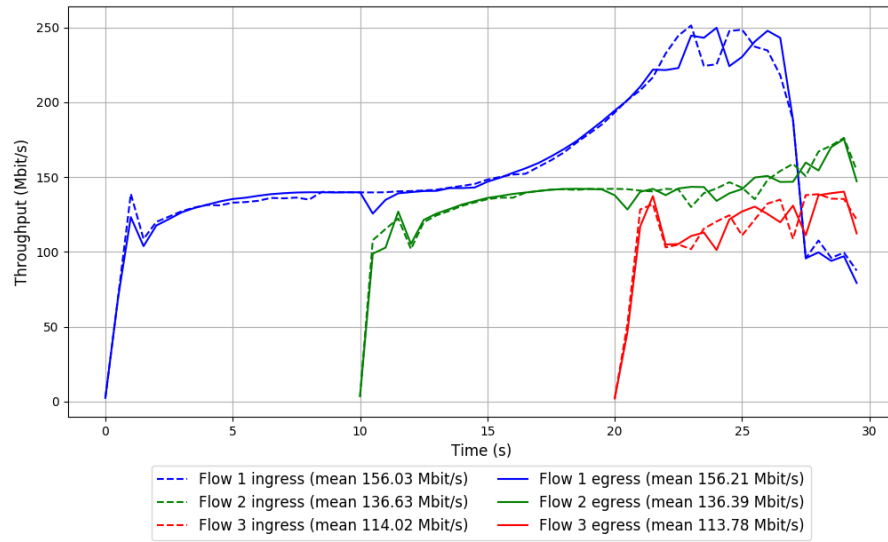
Run 10: Report of TCP BBR — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: 2017-09-18 22:31:23
End at: 2017-09-18 22:31:53


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 284.26 Mbit/s
95th percentile per-packet one-way delay: 55.641 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 156.21 Mbit/s
95th percentile per-packet one-way delay: 55.686 ms
Loss rate: 0.22%
-- Flow 2:
Average throughput: 136.39 Mbit/s
95th percentile per-packet one-way delay: 55.022 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 113.78 Mbit/s
95th percentile per-packet one-way delay: 56.409 ms
Loss rate: 1.25%
```
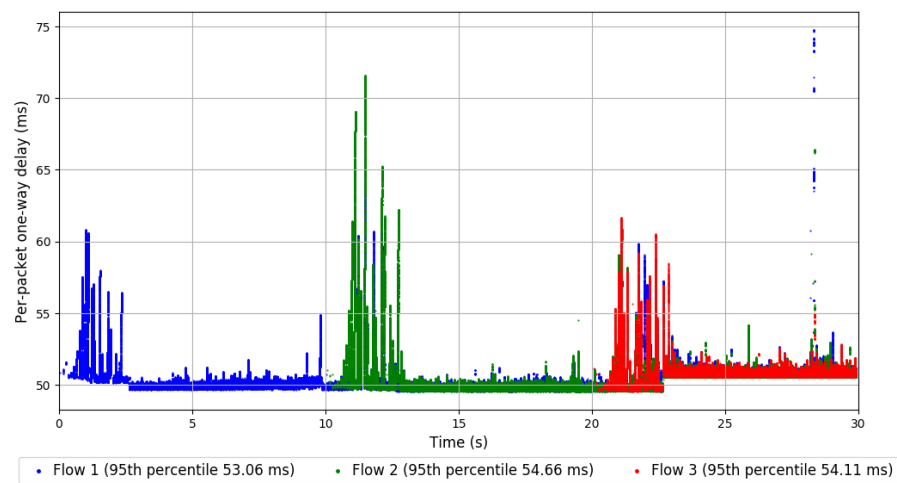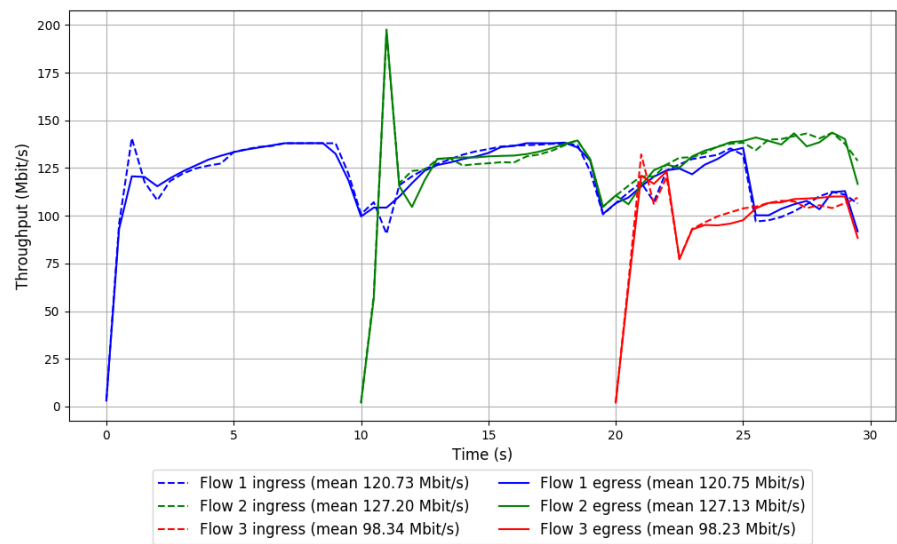
Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2017-09-18 22:40:39
End at: 2017-09-18 22:41:09

# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 237.60 Mbit/s
95th percentile per-packet one-way delay: 53.832 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 120.75 Mbit/s
95th percentile per-packet one-way delay: 53.059 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 127.13 Mbit/s
95th percentile per-packet one-way delay: 54.659 ms
Loss rate: 0.57%
-- Flow 3:
Average throughput: 98.23 Mbit/s
95th percentile per-packet one-way delay: 54.113 ms
Loss rate: 1.13%
```
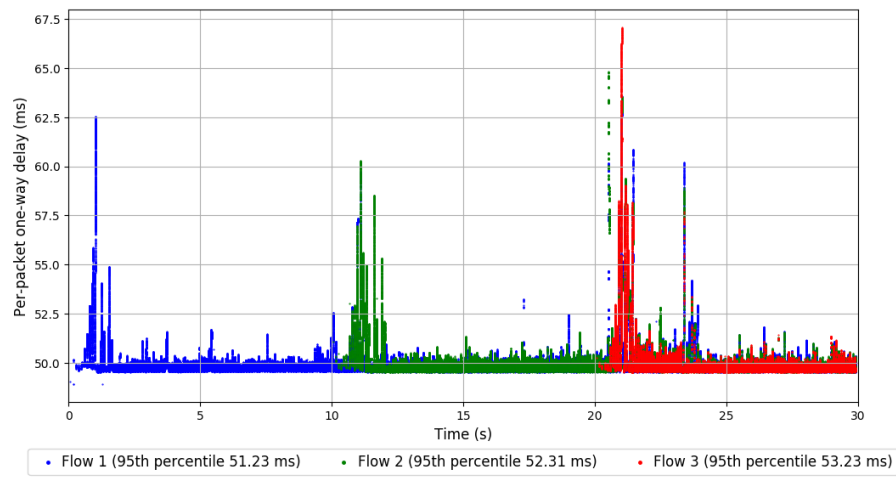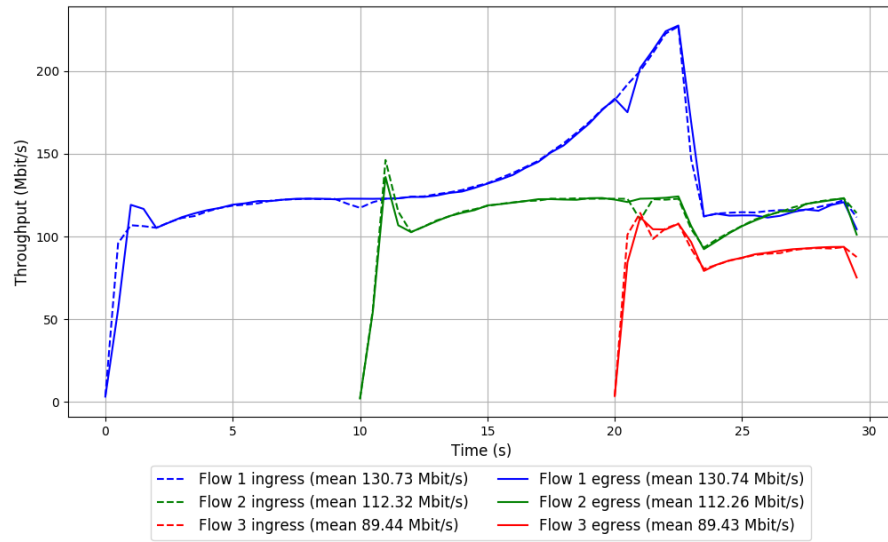
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-09-18 22:49:51
End at: 2017-09-18 22:50:21


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 234.82 Mbit/s
95th percentile per-packet one-way delay: 51.679 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 130.74 Mbit/s
95th percentile per-packet one-way delay: 51.235 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 112.26 Mbit/s
95th percentile per-packet one-way delay: 52.313 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 89.43 Mbit/s
95th percentile per-packet one-way delay: 53.232 ms
Loss rate: 1.06%
```

Run 3: Report of TCP Cubic — Data Link

```
Run 4: Statistics of TCP Cubic

Start at: 2017-09-18 22:59:01
End at: 2017-09-18 22:59:31


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 227.52 Mbit/s
95th percentile per-packet one-way delay: 52.809 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 127.47 Mbit/s
95th percentile per-packet one-way delay: 52.788 ms
Loss rate: 0.35%
-- Flow 2:
Average throughput: 96.33 Mbit/s
95th percentile per-packet one-way delay: 52.917 ms
Loss rate: 0.72%
-- Flow 3:
Average throughput: 109.60 Mbit/s
95th percentile per-packet one-way delay: 52.674 ms
Loss rate: 1.08%
```
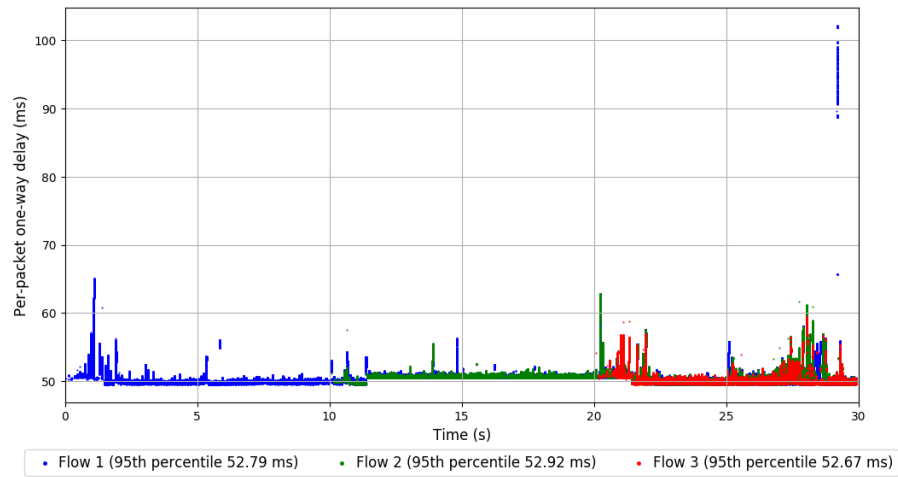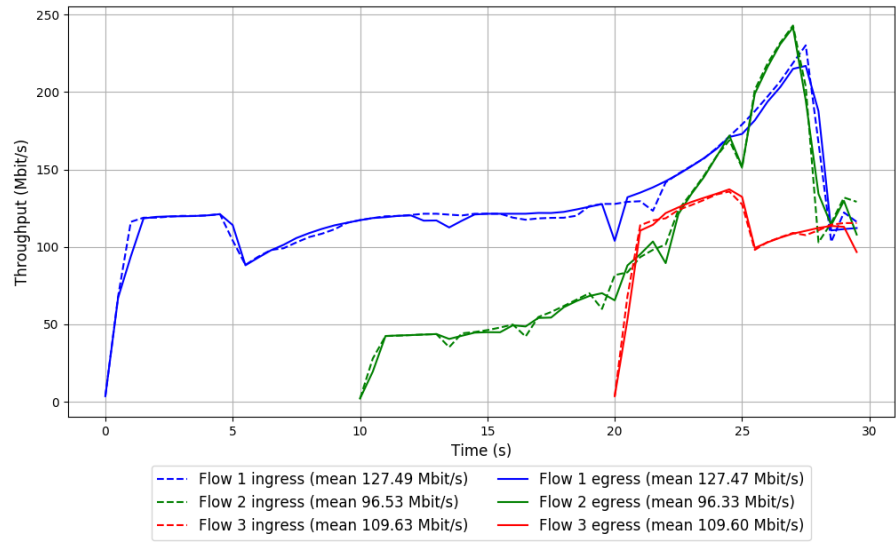
Run 4: Report of TCP Cubic — Data Link

```
Run 5: Statistics of TCP Cubic

Start at: 2017-09-18 23:08:23
End at: 2017-09-18 23:08:53


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 267.34 Mbit/s
95th percentile per-packet one-way delay: 54.379 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 161.45 Mbit/s
95th percentile per-packet one-way delay: 54.987 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 110.44 Mbit/s
95th percentile per-packet one-way delay: 51.564 ms
Loss rate: 0.50%
-- Flow 3:
Average throughput: 98.86 Mbit/s
95th percentile per-packet one-way delay: 54.273 ms
Loss rate: 1.04%
```
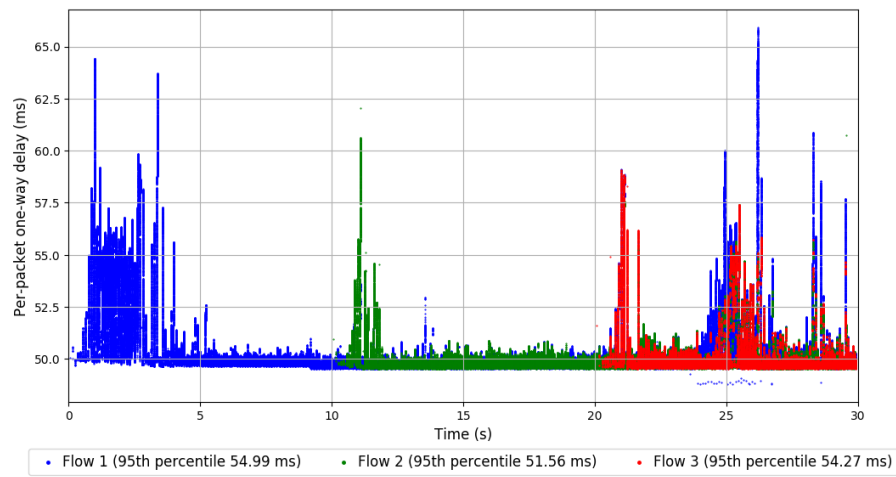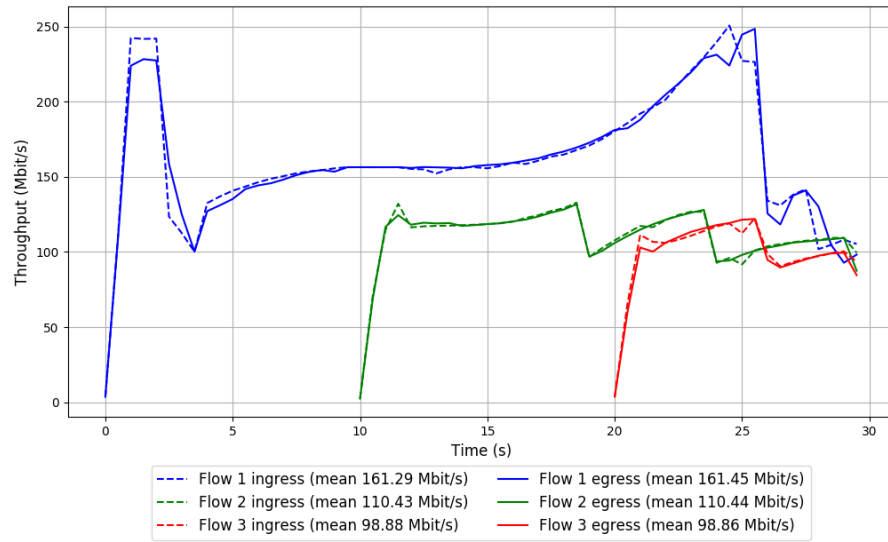
Run 5: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 161.29 Mbit/s)   Flow 1 egress (mean 161.45 Mbit/s)
Flow 2 ingress (mean 110.43 Mbit/s)   Flow 2 egress (mean 110.44 Mbit/s)
Flow 3 ingress (mean 98.88 Mbit/s)   Flow 3 egress (mean 98.86 Mbit/s)

Flow 1 (95th percentile 54.99 ms)   Flow 2 (95th percentile 51.56 ms)   Flow 3 (95th percentile 54.27 ms)

```
Run 6: Statistics of TCP Cubic

Start at: 2017-09-18 23:17:29
End at: 2017-09-18 23:17:59


# Below is generated by plot.py at 2017-09-19 02:10:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 300.04 Mbit/s
95th percentile per-packet one-way delay: 56.116 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 169.71 Mbit/s
95th percentile per-packet one-way delay: 56.371 ms
Loss rate: 0.59%
-- Flow 2:
Average throughput: 152.39 Mbit/s
95th percentile per-packet one-way delay: 54.742 ms
Loss rate: 1.39%
-- Flow 3:
Average throughput: 88.55 Mbit/s
95th percentile per-packet one-way delay: 54.352 ms
Loss rate: 2.56%
```
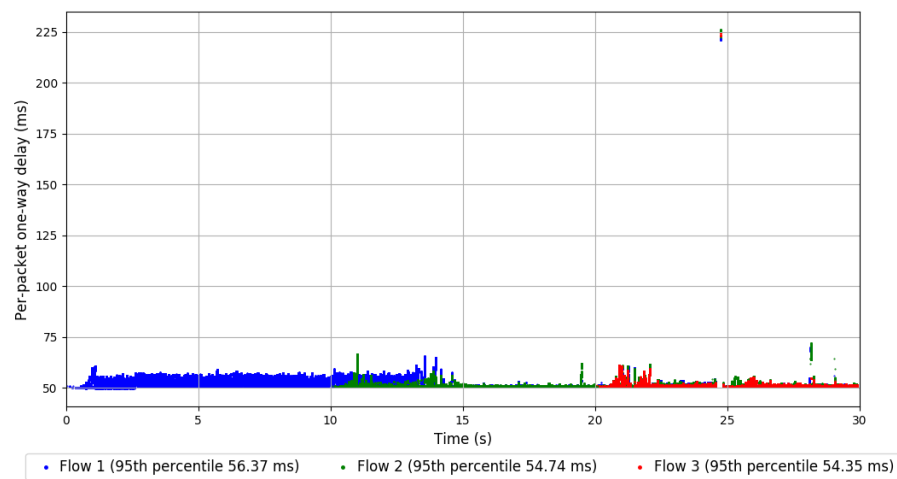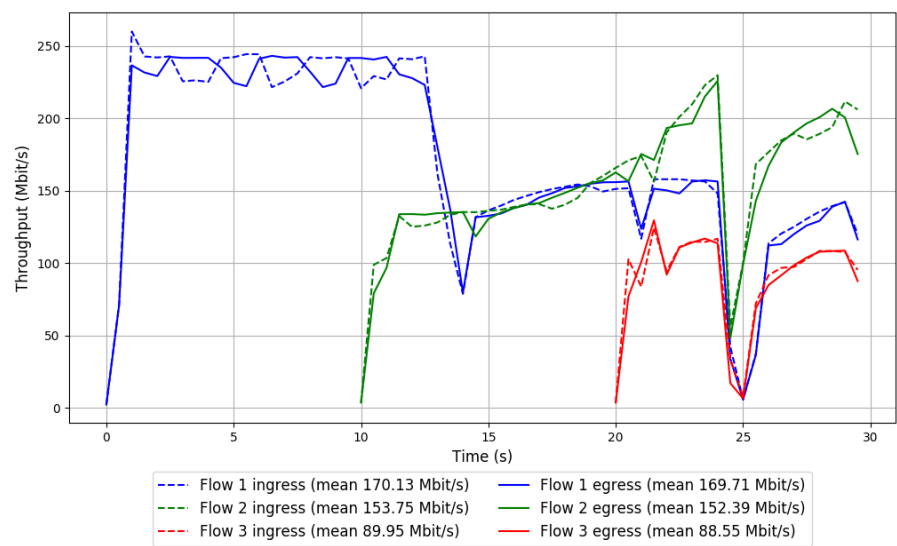
Run 6: Report of TCP Cubic — Data Link

```
Run 7: Statistics of TCP Cubic

Start at: 2017-09-18 23:26:43
End at: 2017-09-18 23:27:13


# Below is generated by plot.py at 2017-09-19 02:11:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 282.25 Mbit/s
95th percentile per-packet one-way delay: 56.691 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 171.83 Mbit/s
95th percentile per-packet one-way delay: 57.336 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 110.39 Mbit/s
95th percentile per-packet one-way delay: 55.344 ms
Loss rate: 0.71%
-- Flow 3:
Average throughput: 112.73 Mbit/s
95th percentile per-packet one-way delay: 55.730 ms
Loss rate: 1.15%
```
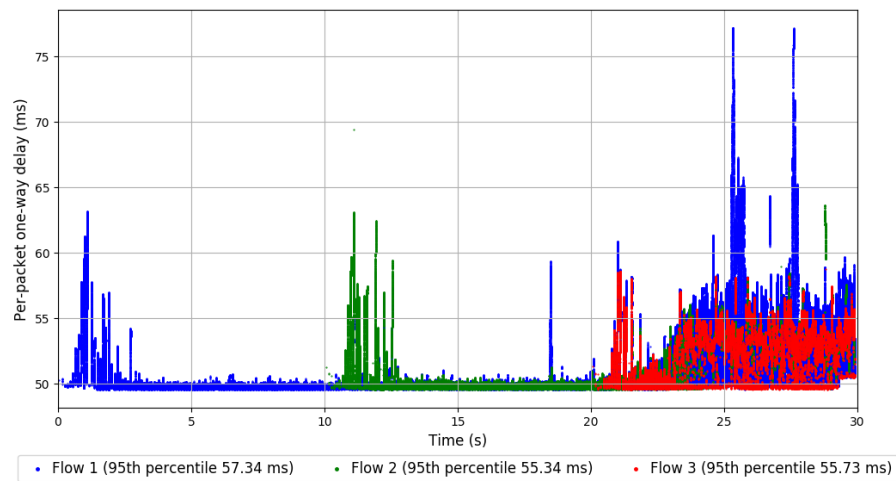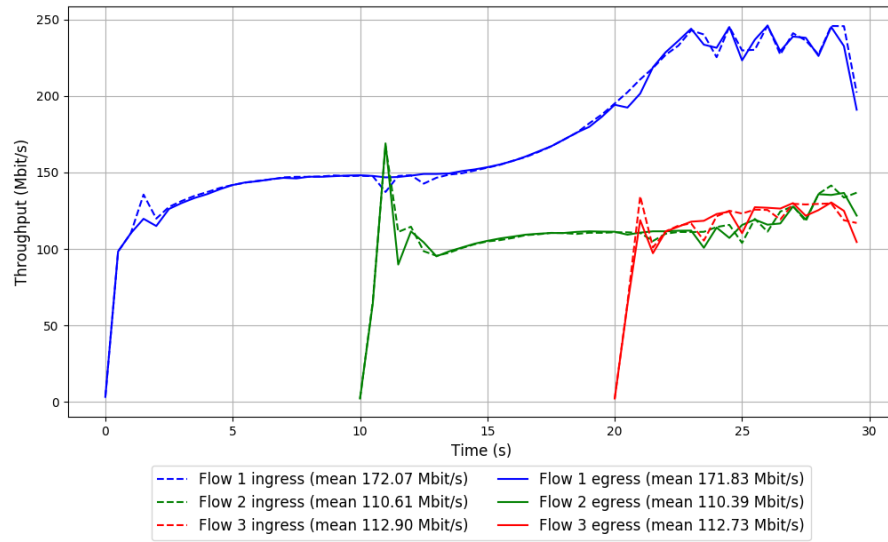
Run 7: Report of TCP Cubic — Data Link

```
Run 8: Statistics of TCP Cubic

Start at: 2017-09-18 23:35:58
End at: 2017-09-18 23:36:28


# Below is generated by plot.py at 2017-09-19 02:12:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 293.83 Mbit/s
95th percentile per-packet one-way delay: 54.771 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 141.18 Mbit/s
95th percentile per-packet one-way delay: 53.577 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 149.47 Mbit/s
95th percentile per-packet one-way delay: 54.877 ms
Loss rate: 0.65%
-- Flow 3:
Average throughput: 161.91 Mbit/s
95th percentile per-packet one-way delay: 55.744 ms
Loss rate: 0.93%
```
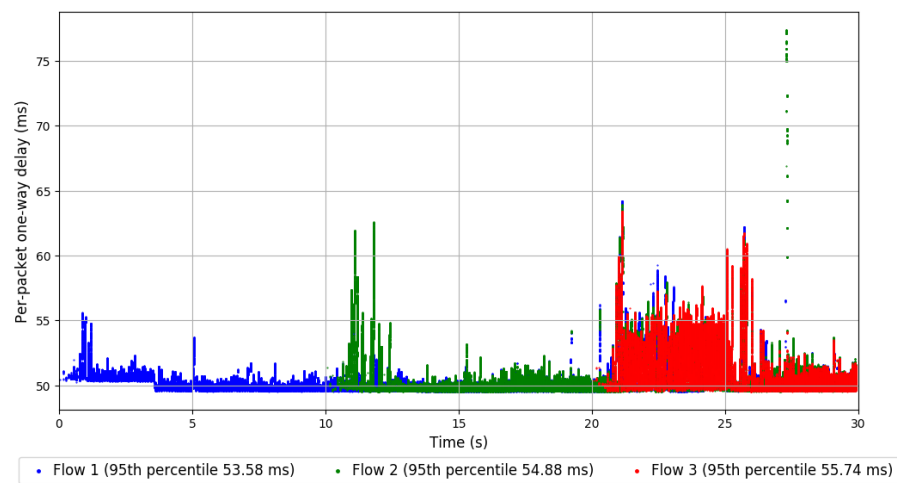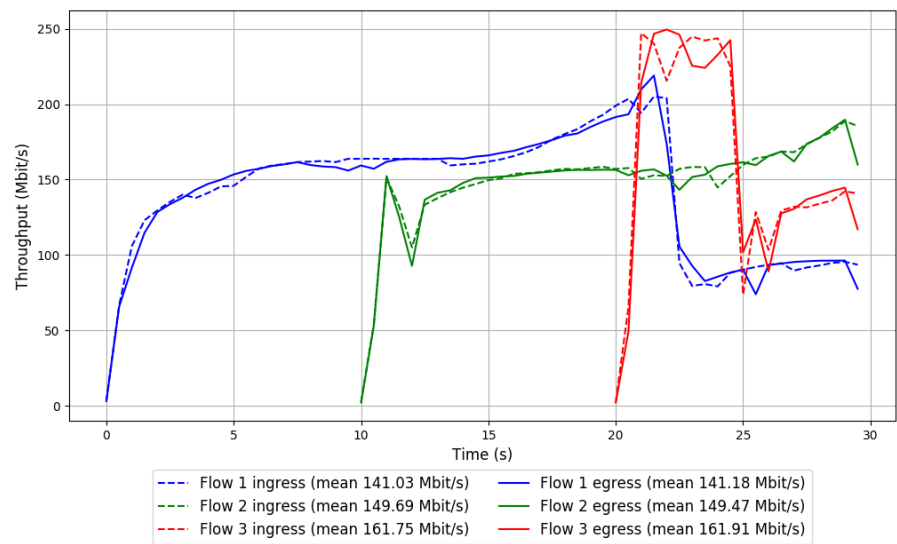
Run 8: Report of TCP Cubic — Data Link

```
Run 9: Statistics of TCP Cubic

Start at: 2017-09-18 23:45:16
End at: 2017-09-18 23:45:46


# Below is generated by plot.py at 2017-09-19 02:12:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 310.52 Mbit/s
95th percentile per-packet one-way delay: 55.836 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 157.70 Mbit/s
95th percentile per-packet one-way delay: 54.962 ms
Loss rate: 0.29%
-- Flow 2:
Average throughput: 177.01 Mbit/s
95th percentile per-packet one-way delay: 56.555 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 107.36 Mbit/s
95th percentile per-packet one-way delay: 55.580 ms
Loss rate: 1.28%
```
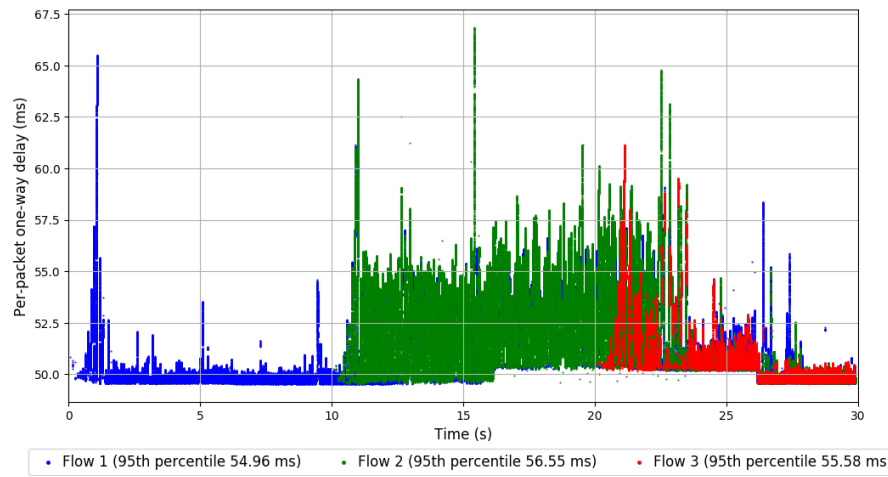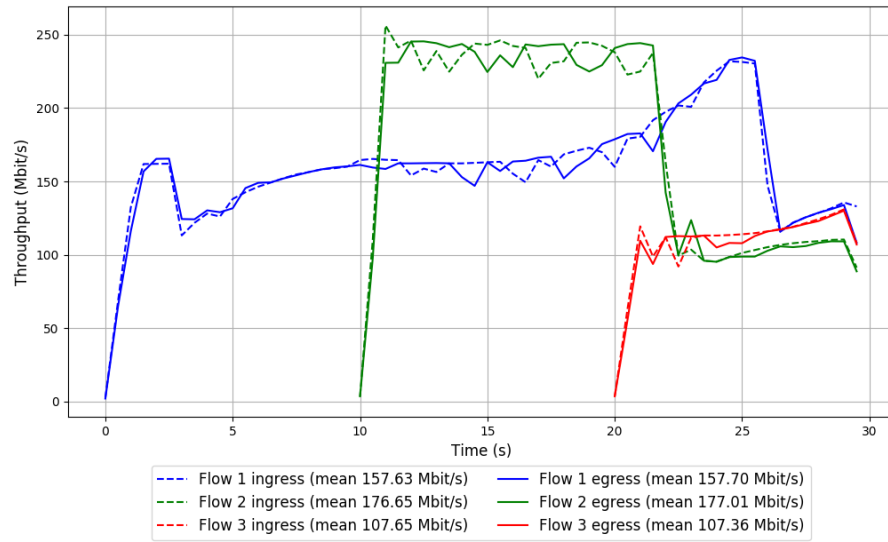
Run 9: Report of TCP Cubic — Data Link

```
Run 10: Statistics of TCP Cubic

Start at: 2017-09-18 23:54:26
End at: 2017-09-18 23:54:56


# Below is generated by plot.py at 2017-09-19 02:12:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 265.33 Mbit/s
95th percentile per-packet one-way delay: 51.695 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 133.67 Mbit/s
95th percentile per-packet one-way delay: 51.182 ms
Loss rate: 0.39%
-- Flow 2:
Average throughput: 134.50 Mbit/s
95th percentile per-packet one-way delay: 51.619 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 128.68 Mbit/s
95th percentile per-packet one-way delay: 52.118 ms
Loss rate: 1.01%
```
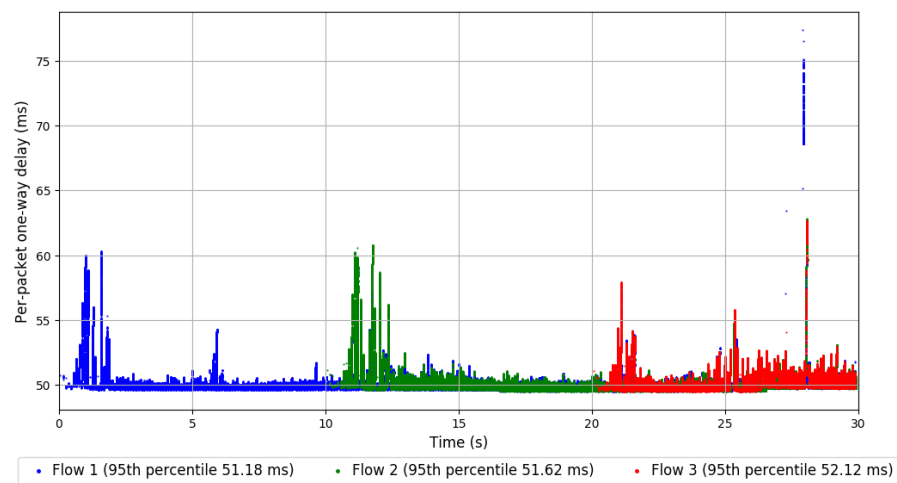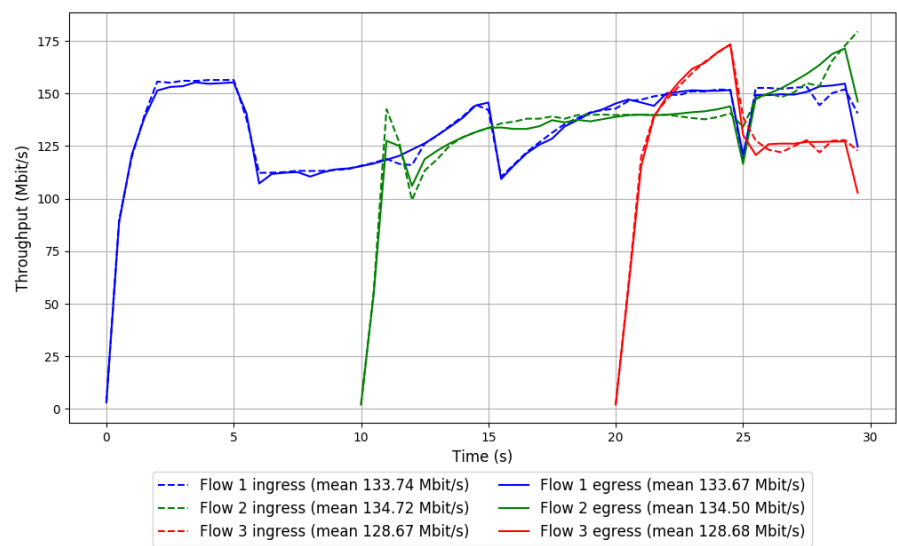
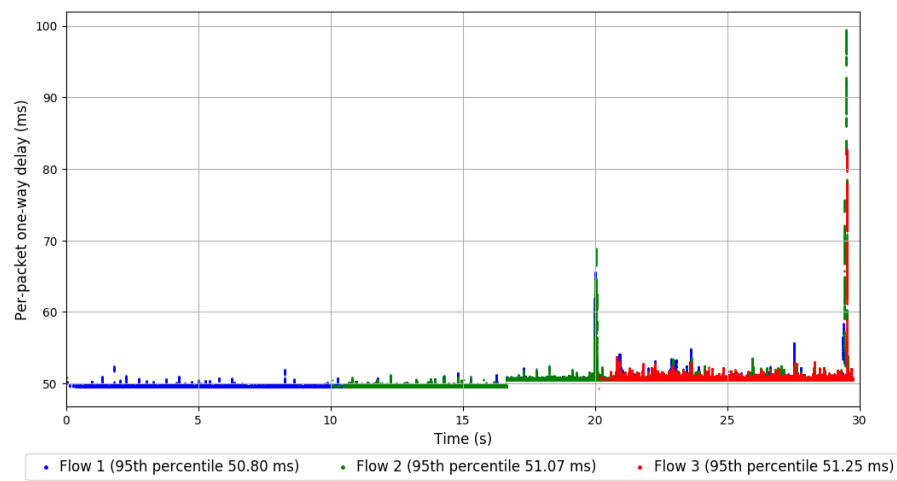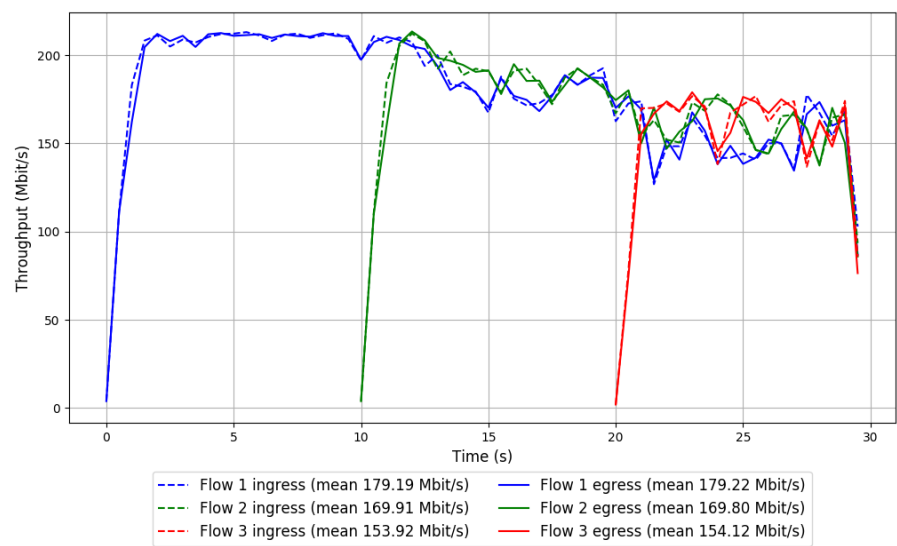Run 10: Report of TCP Cubic — Data Link

```
Run 1: Statistics of Indigo

Start at: 2017-09-18 22:36:45
End at: 2017-09-18 22:37:15

# Below is generated by plot.py at 2017-09-19 02:13:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 341.50 Mbit/s
95th percentile per-packet one-way delay: 50.976 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 179.22 Mbit/s
95th percentile per-packet one-way delay: 50.798 ms
Loss rate: 0.33%
-- Flow 2:
Average throughput: 169.80 Mbit/s
95th percentile per-packet one-way delay: 51.074 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 154.12 Mbit/s
95th percentile per-packet one-way delay: 51.248 ms
Loss rate: 0.93%
```

Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-09-18 22:46:00
End at: 2017-09-18 22:46:30


# Below is generated by plot.py at 2017-09-19 02:14:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 334.36 Mbit/s
95th percentile per-packet one-way delay: 50.749 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 177.79 Mbit/s
95th percentile per-packet one-way delay: 50.641 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 164.28 Mbit/s
95th percentile per-packet one-way delay: 50.875 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 146.44 Mbit/s
95th percentile per-packet one-way delay: 50.851 ms
Loss rate: 1.25%
```
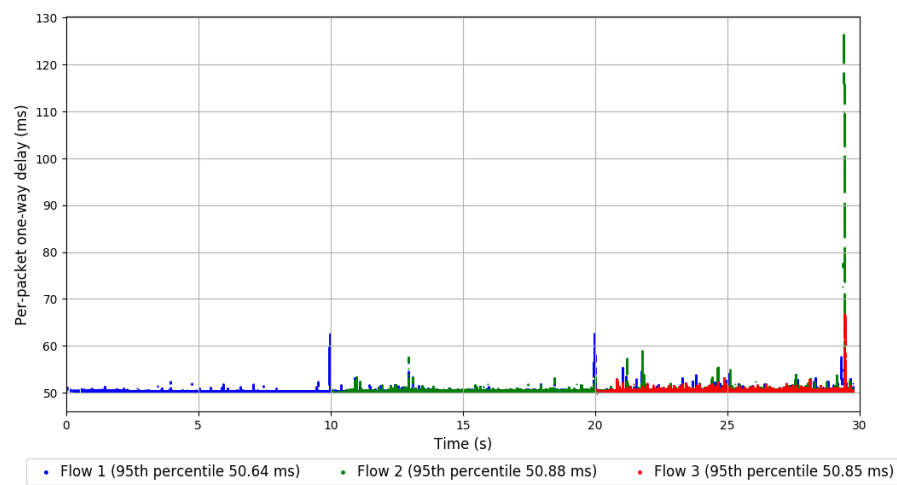
Run 2: Report of Indigo — Data Link

Flow 1 ingress (mean 177.63 Mbit/s) Flow 1 egress (mean 177.79 Mbit/s)
Flow 2 ingress (mean 164.05 Mbit/s) Flow 2 egress (mean 164.28 Mbit/s)
Flow 3 ingress (mean 146.76 Mbit/s) Flow 3 egress (mean 146.44 Mbit/s)

Flow 1 (95th percentile 50.64 ms) Flow 2 (95th percentile 50.88 ms) Flow 3 (95th percentile 50.85 ms)

47

```
Run 3: Statistics of Indigo

Start at: 2017-09-18 22:55:19
End at: 2017-09-18 22:55:49
```
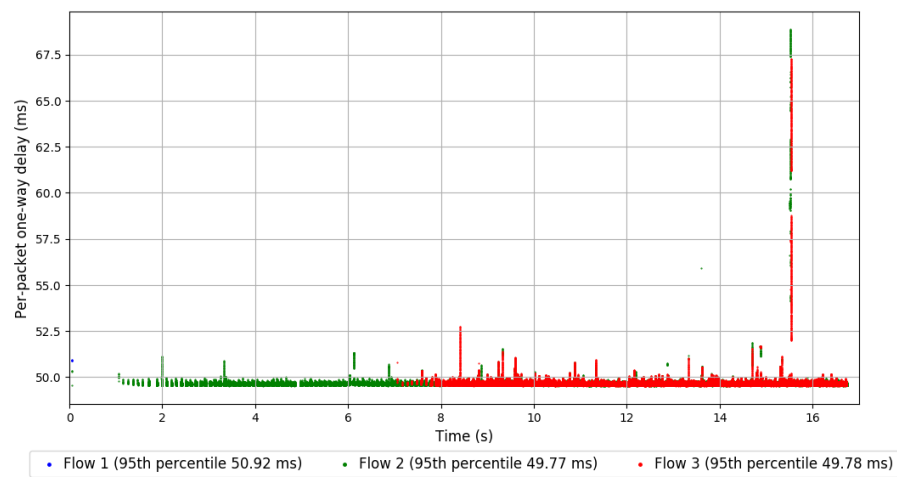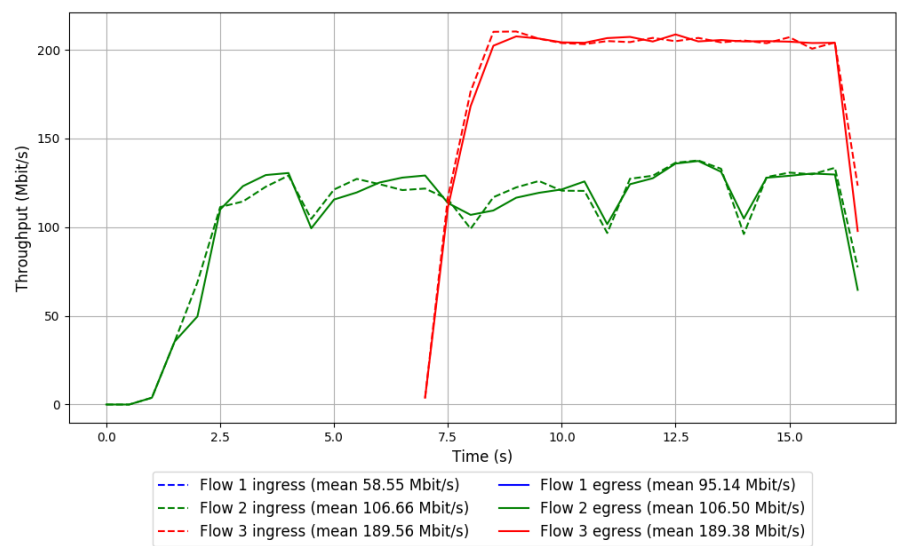
Run 3: Report of Indigo — Data Link

Flow 1 ingress (mean 58.55 Mbit/s)   Flow 1 egress (mean 95.14 Mbit/s)
Flow 2 ingress (mean 106.66 Mbit/s)   Flow 2 egress (mean 106.50 Mbit/s)
Flow 3 ingress (mean 189.56 Mbit/s)   Flow 3 egress (mean 189.38 Mbit/s)

Flow 1 (95th percentile 50.92 ms)   Flow 2 (95th percentile 49.77 ms)   Flow 3 (95th percentile 49.78 ms)

49

```
Run 4: Statistics of Indigo

Start at: 2017-09-18 23:04:25
End at: 2017-09-18 23:04:55


# Below is generated by plot.py at 2017-09-19 02:16:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 342.87 Mbit/s
95th percentile per-packet one-way delay: 50.731 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 175.09 Mbit/s
95th percentile per-packet one-way delay: 50.682 ms
Loss rate: 0.31%
-- Flow 2:
Average throughput: 175.77 Mbit/s
95th percentile per-packet one-way delay: 50.856 ms
Loss rate: 0.59%
-- Flow 3:
Average throughput: 158.19 Mbit/s
95th percentile per-packet one-way delay: 50.696 ms
Loss rate: 0.87%
```
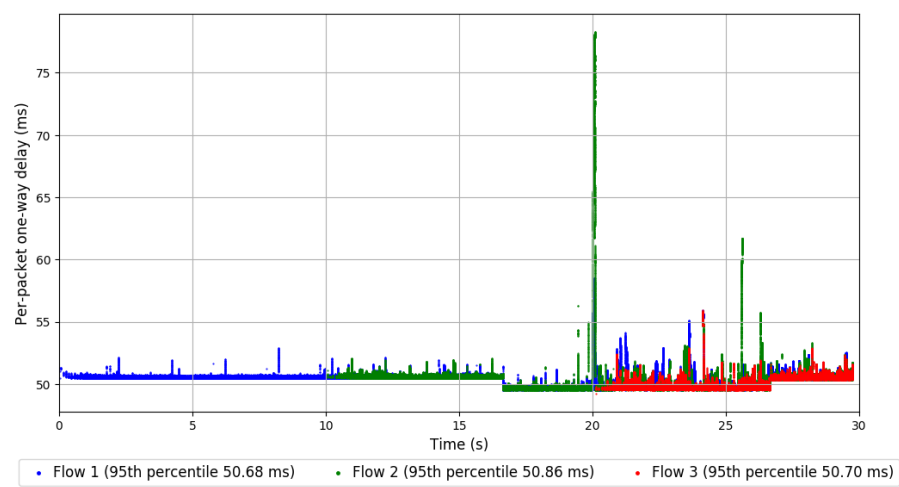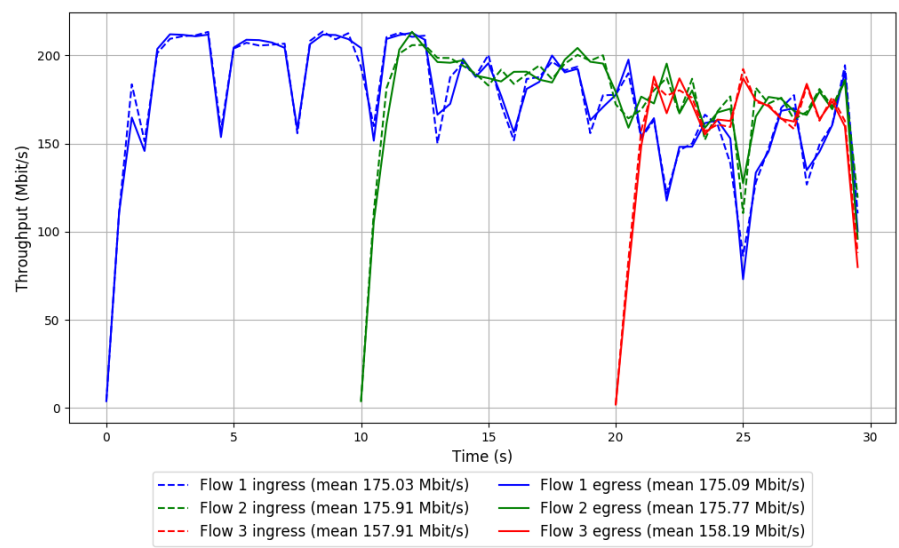
Run 4: Report of Indigo — Data Link

Flow 1 ingress (mean 175.03 Mbit/s) --- Flow 1 egress (mean 175.09 Mbit/s)
Flow 2 ingress (mean 175.91 Mbit/s) --- Flow 2 egress (mean 175.77 Mbit/s)
Flow 3 ingress (mean 157.91 Mbit/s) --- Flow 3 egress (mean 158.19 Mbit/s)

Flow 1 (95th percentile 50.68 ms)   Flow 2 (95th percentile 50.86 ms)   Flow 3 (95th percentile 50.70 ms)
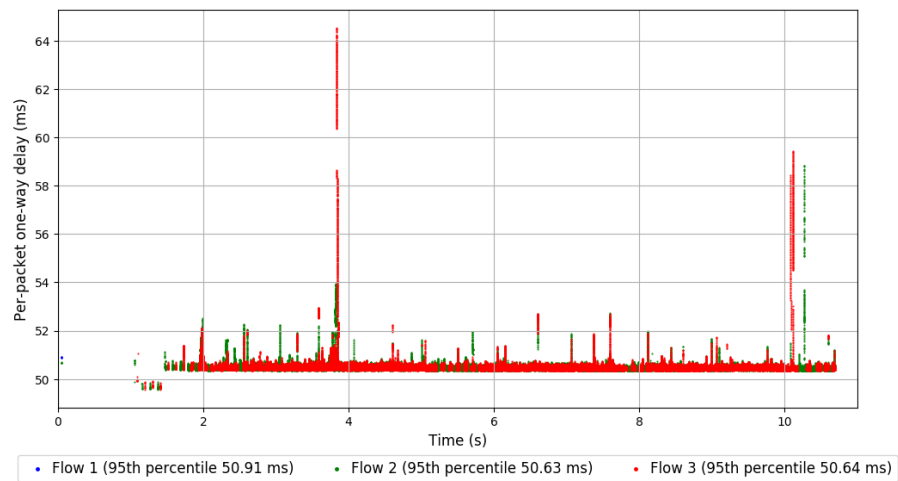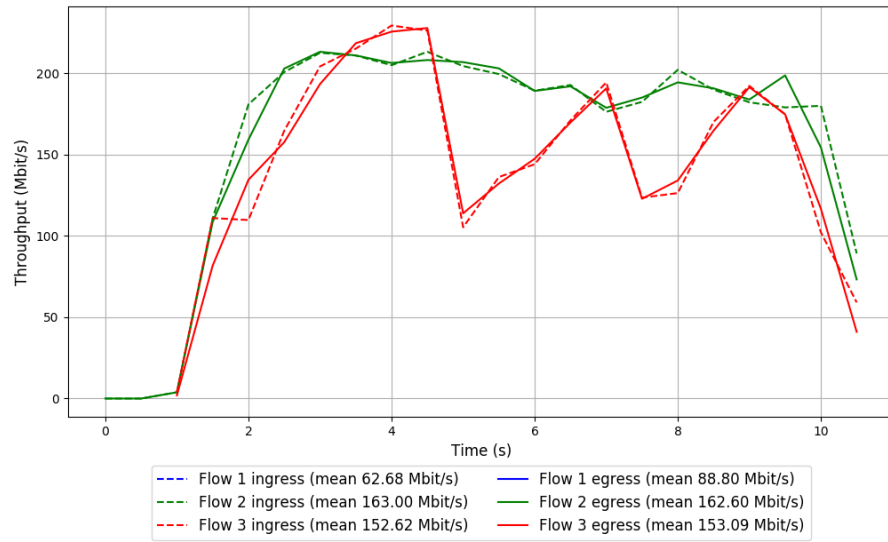
51

Run 5: Statistics of Indigo

Start at: 2017-09-18 23:13:51
End at: 2017-09-18 23:14:21

Run 5: Report of Indigo — Data Link

Flow 1 ingress (mean 62.68 Mbit/s) --- Flow 1 egress (mean 88.80 Mbit/s)
Flow 2 ingress (mean 163.00 Mbit/s) --- Flow 2 egress (mean 162.60 Mbit/s)
Flow 3 ingress (mean 152.62 Mbit/s) --- Flow 3 egress (mean 153.09 Mbit/s)

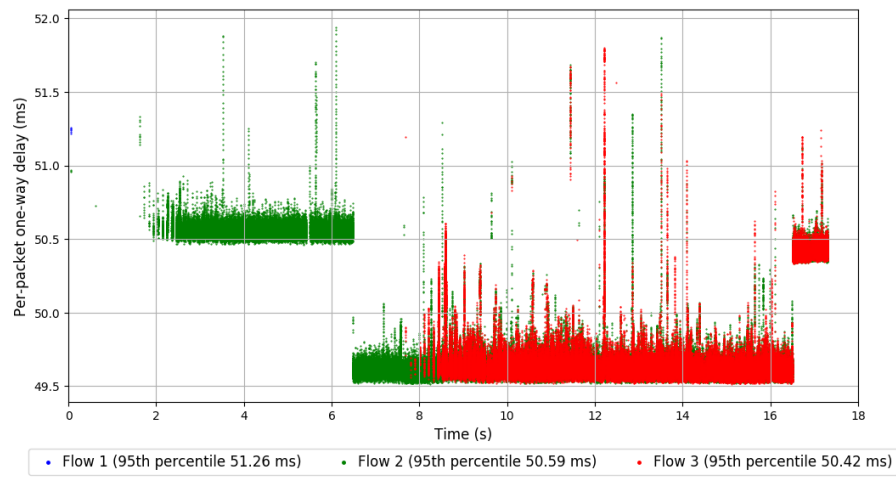Flow 1 (95th percentile 50.91 ms)   Flow 2 (95th percentile 50.63 ms)   Flow 3 (95th percentile 50.64 ms)
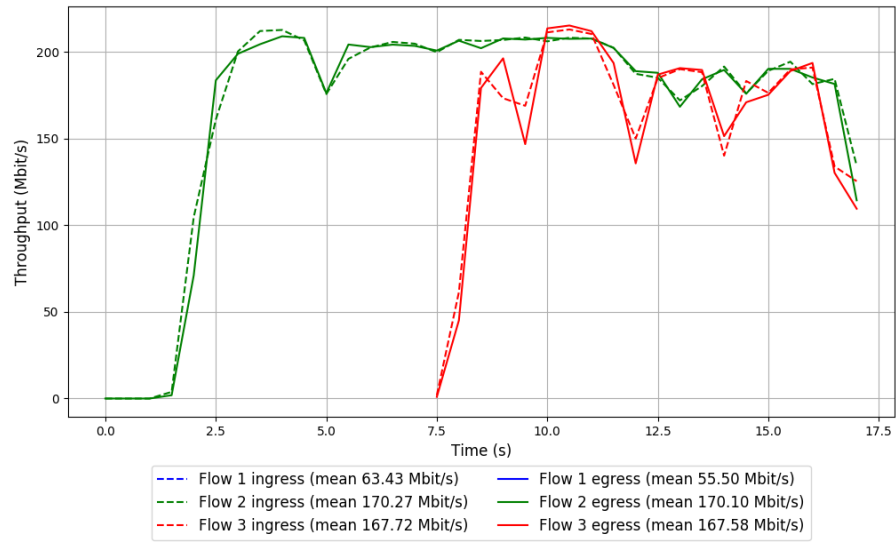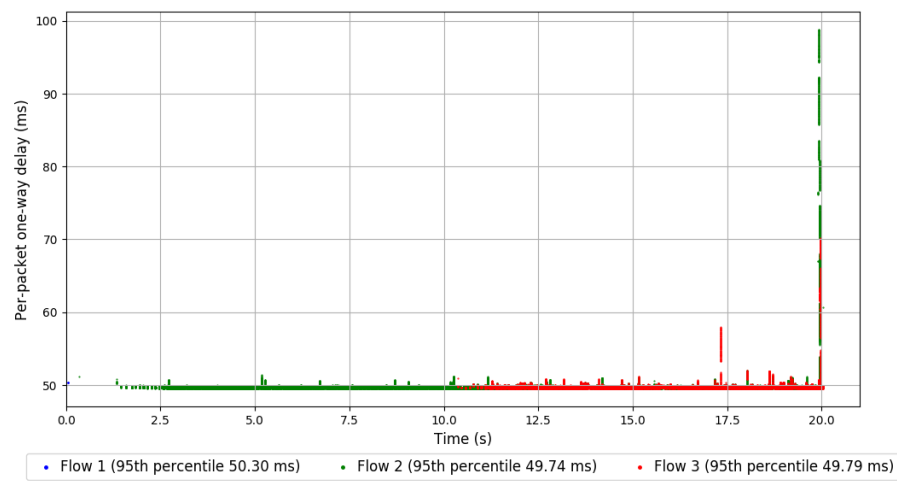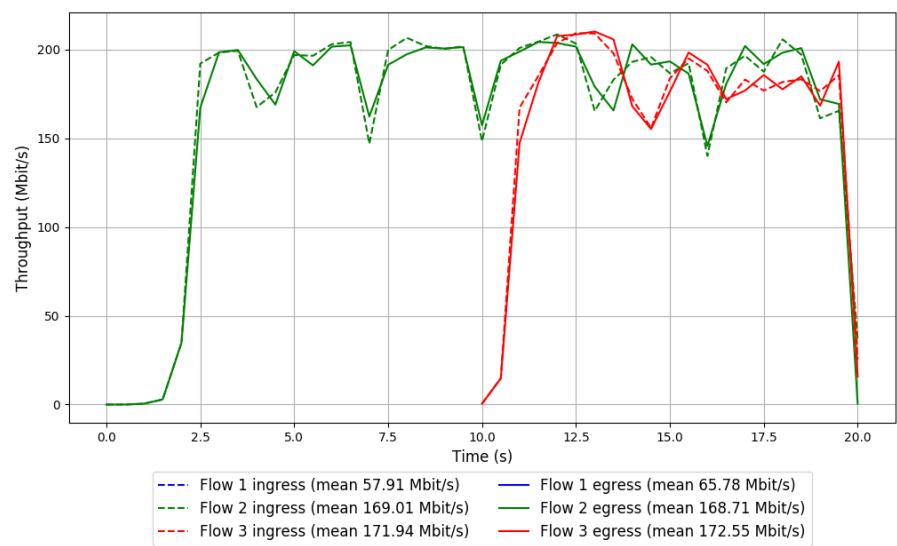
Run 6: Statistics of Indigo

Start at: 2017-09-18 23:23:03
End at: 2017-09-18 23:23:33

Run 6: Report of Indigo — Data Link

```
Run 7: Statistics of Indigo

Start at: 2017-09-18 23:32:19
End at: 2017-09-18 23:32:49
```

Run 7: Report of Indigo — Data Link

Flow 1 ingress (mean 57.91 Mbit/s) --- Flow 1 egress (mean 65.78 Mbit/s)
Flow 2 ingress (mean 169.01 Mbit/s) --- Flow 2 egress (mean 168.71 Mbit/s)
Flow 3 ingress (mean 171.94 Mbit/s) --- Flow 3 egress (mean 172.55 Mbit/s)

Flow 1 (95th percentile 50.30 ms)   Flow 2 (95th percentile 49.74 ms)   Flow 3 (95th percentile 49.79 ms)

57

```
Run 8: Statistics of Indigo

Start at: 2017-09-18 23:41:20
End at: 2017-09-18 23:41:50

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 323.50 Mbit/s
95th percentile per-packet one-way delay: 49.945 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 166.22 Mbit/s
95th percentile per-packet one-way delay: 49.880 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 165.41 Mbit/s
95th percentile per-packet one-way delay: 49.995 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 141.93 Mbit/s
95th percentile per-packet one-way delay: 50.031 ms
Loss rate: 1.18%
```
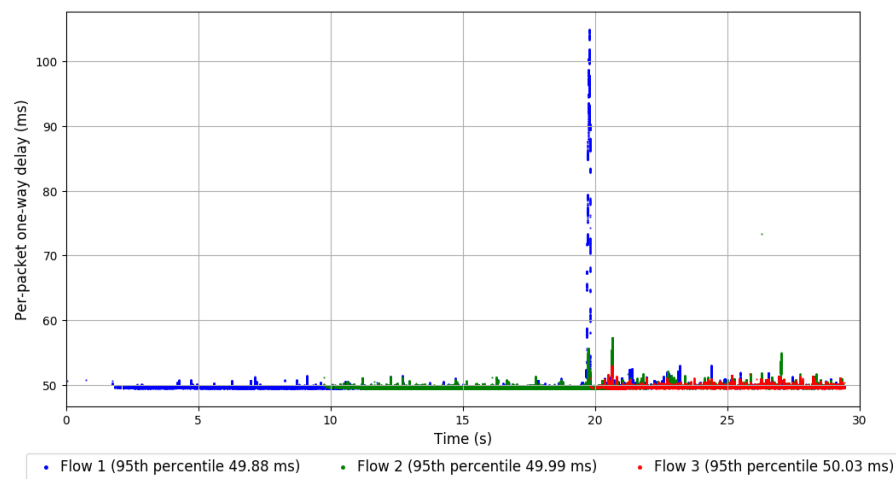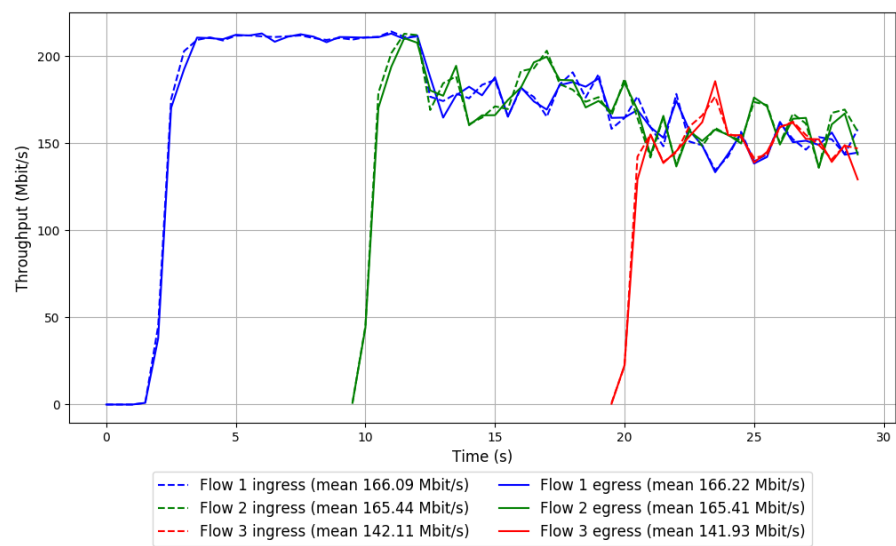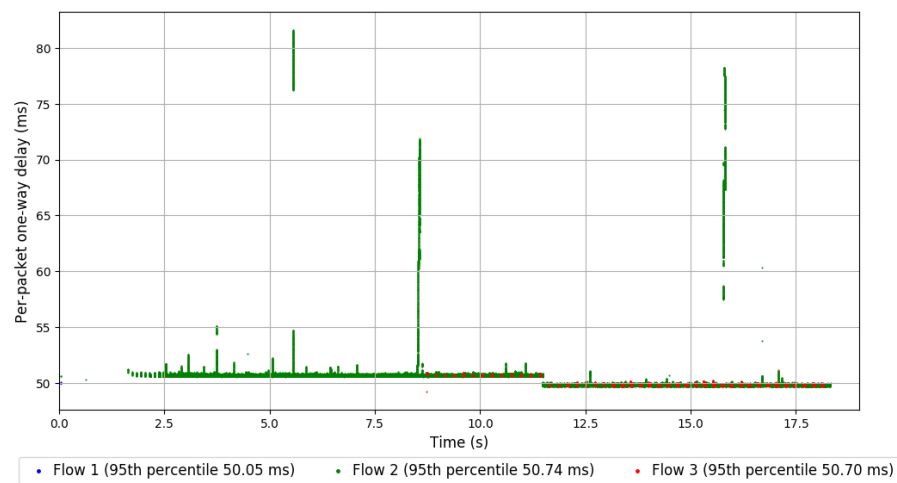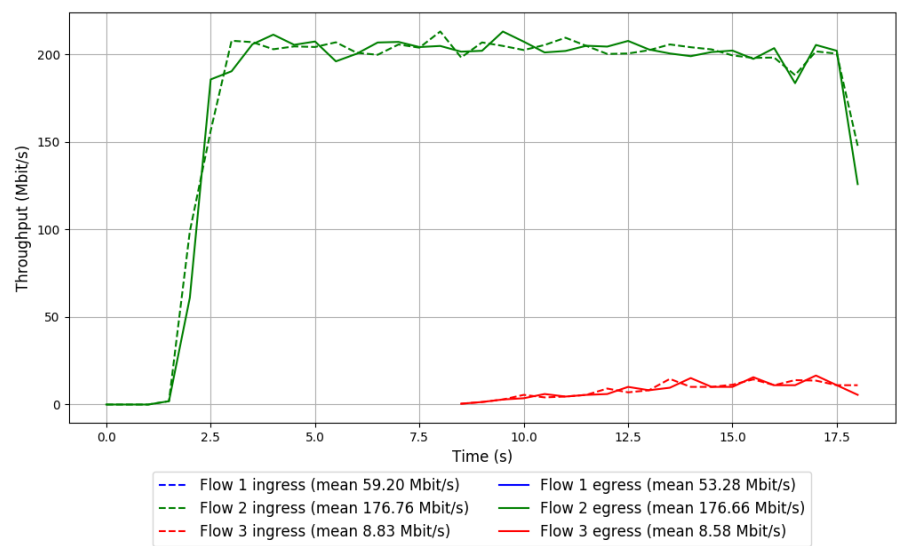
Run 8: Report of Indigo — Data Link

```
Run 9: Statistics of Indigo

Start at: 2017-09-18 23:50:49
End at: 2017-09-18 23:51:19
```

Run 9: Report of Indigo — Data Link

Flow 1 ingress (mean 59.20 Mbit/s)   Flow 1 egress (mean 53.28 Mbit/s)
Flow 2 ingress (mean 176.76 Mbit/s)   Flow 2 egress (mean 176.66 Mbit/s)
Flow 3 ingress (mean 8.83 Mbit/s)   Flow 3 egress (mean 8.58 Mbit/s)

Flow 1 (95th percentile 50.05 ms)   Flow 2 (95th percentile 50.74 ms)   Flow 3 (95th percentile 50.70 ms)
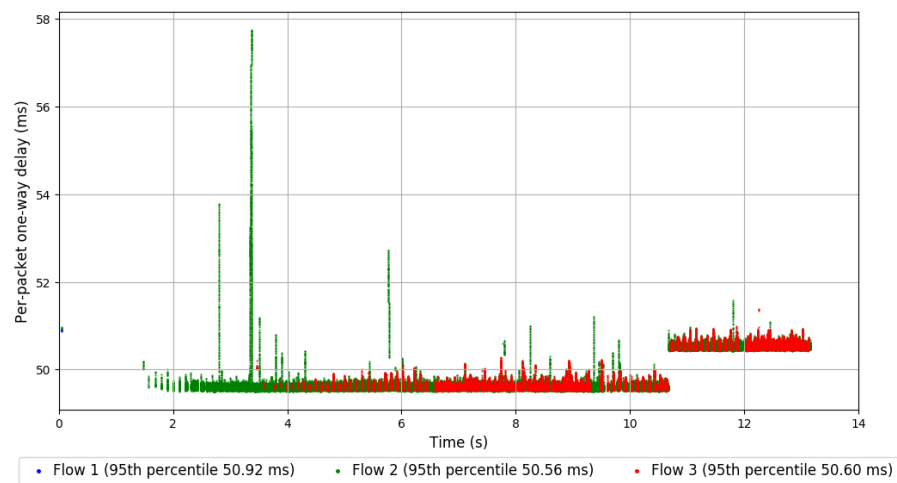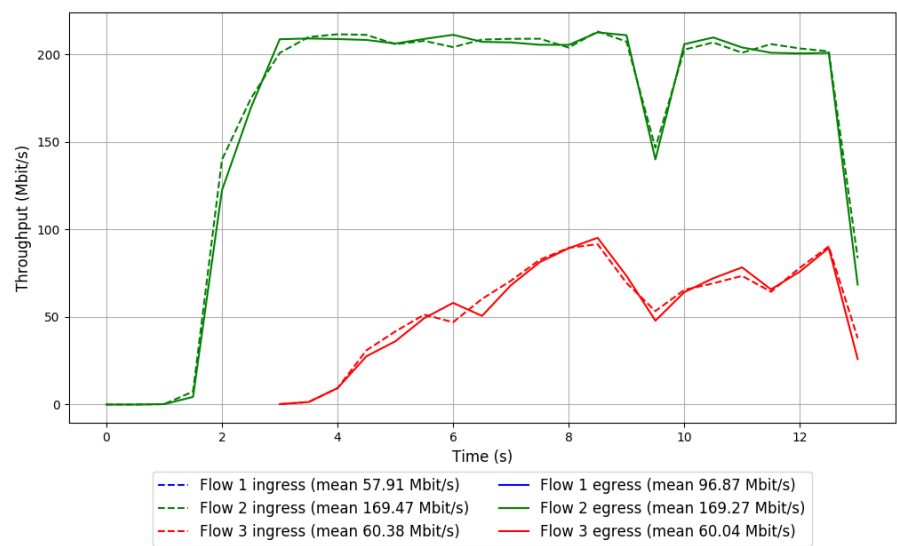
61

Run 10: Statistics of Indigo

Start at: 2017-09-18 23:59:55
End at: 2017-09-19 00:00:25

Run 10: Report of Indigo — Data Link

Flow 1 ingress (mean 57.91 Mbit/s)
Flow 2 ingress (mean 169.47 Mbit/s)
Flow 3 ingress (mean 60.38 Mbit/s)
Flow 1 egress (mean 96.87 Mbit/s)
Flow 2 egress (mean 169.27 Mbit/s)
Flow 3 egress (mean 60.04 Mbit/s)

Flow 1 (95th percentile 50.92 ms)
Flow 2 (95th percentile 50.56 ms)
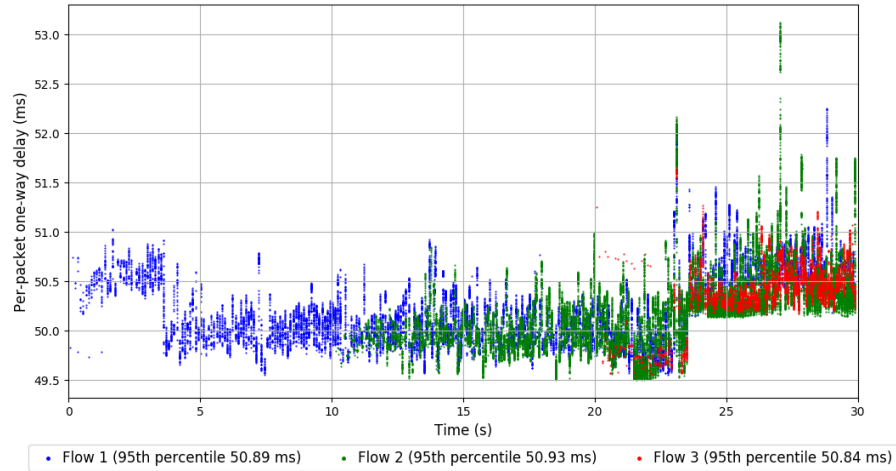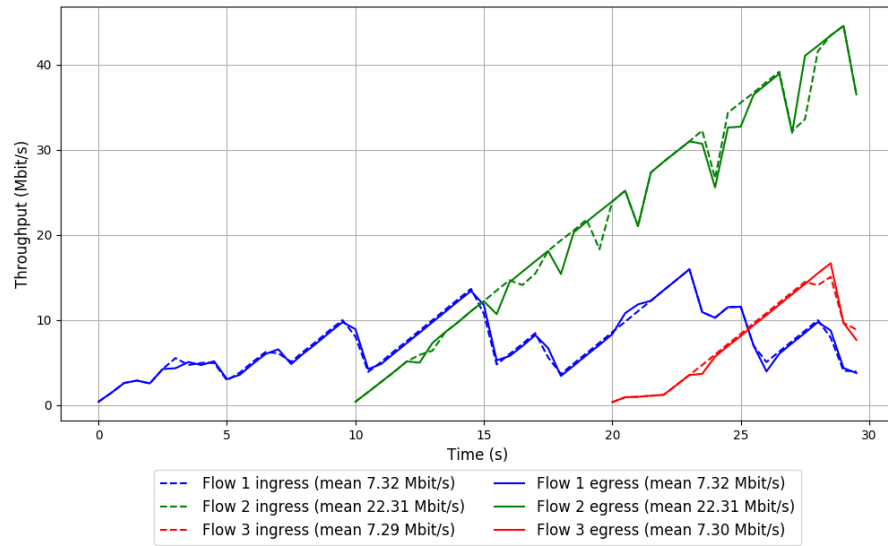Flow 3 (95th percentile 50.60 ms)

63

```
Run 1: Statistics of LEDBAT

Start at: 2017-09-18 22:37:48
End at: 2017-09-18 22:38:18

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 24.53 Mbit/s
95th percentile per-packet one-way delay: 50.902 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 7.32 Mbit/s
95th percentile per-packet one-way delay: 50.888 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 22.31 Mbit/s
95th percentile per-packet one-way delay: 50.929 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 50.836 ms
Loss rate: 0.85%
```

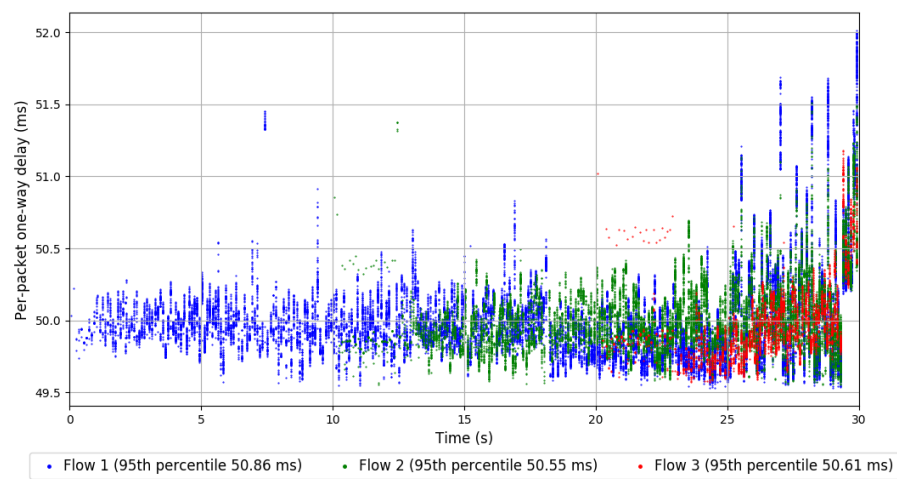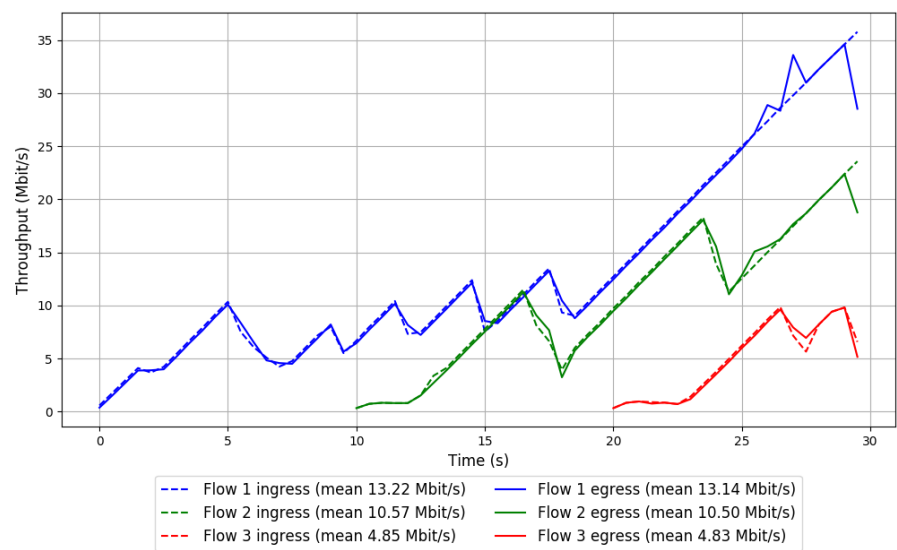# Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2017-09-18 22:47:03
End at: 2017-09-18 22:47:33


# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 21.70 Mbit/s
95th percentile per-packet one-way delay: 50.697 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 13.14 Mbit/s
95th percentile per-packet one-way delay: 50.856 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 10.50 Mbit/s
95th percentile per-packet one-way delay: 50.550 ms
Loss rate: 1.16%
-- Flow 3:
Average throughput: 4.83 Mbit/s
95th percentile per-packet one-way delay: 50.607 ms
Loss rate: 1.46%
```

Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2017-09-18 22:56:08
End at: 2017-09-18 22:56:38

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 27.29 Mbit/s
95th percentile per-packet one-way delay: 51.236 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 14.77 Mbit/s
95th percentile per-packet one-way delay: 51.251 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 15.31 Mbit/s
95th percentile per-packet one-way delay: 51.237 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 7.16 Mbit/s
95th percentile per-packet one-way delay: 51.091 ms
Loss rate: 1.55%
```
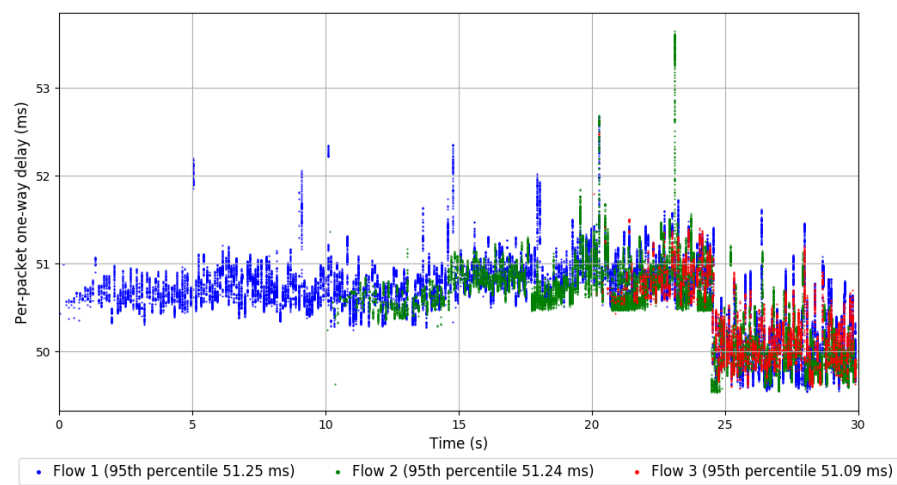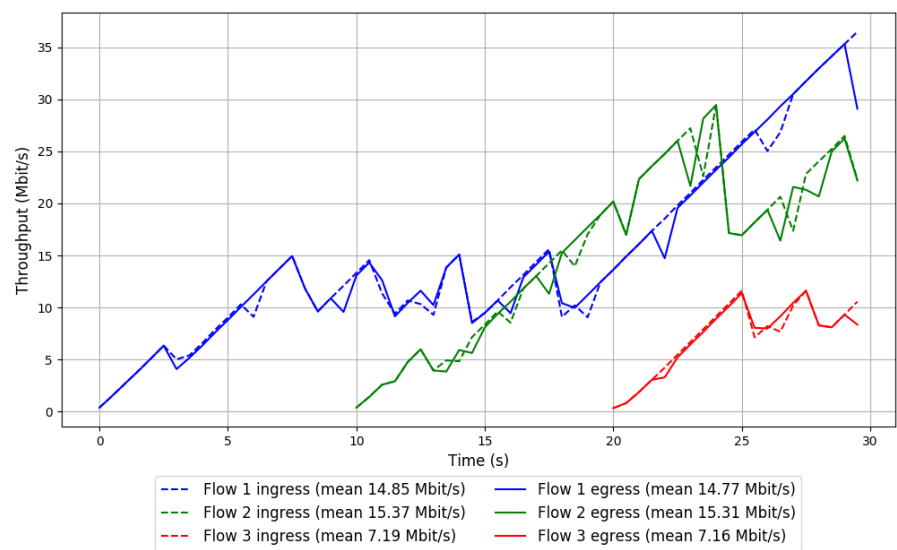
Run 3: Report of LEDBAT — Data Link

```
Run 4: Statistics of LEDBAT

Start at: 2017-09-18 23:05:28
End at: 2017-09-18 23:05:58

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 21.76 Mbit/s
95th percentile per-packet one-way delay: 51.229 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 11.00 Mbit/s
95th percentile per-packet one-way delay: 50.901 ms
Loss rate: 0.60%
-- Flow 2:
Average throughput: 13.96 Mbit/s
95th percentile per-packet one-way delay: 51.396 ms
Loss rate: 1.23%
-- Flow 3:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 51.162 ms
Loss rate: 1.55%
```
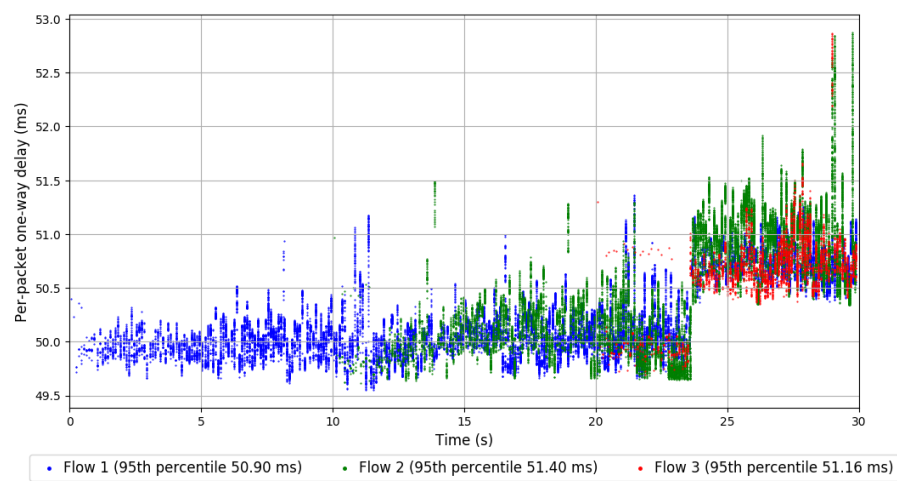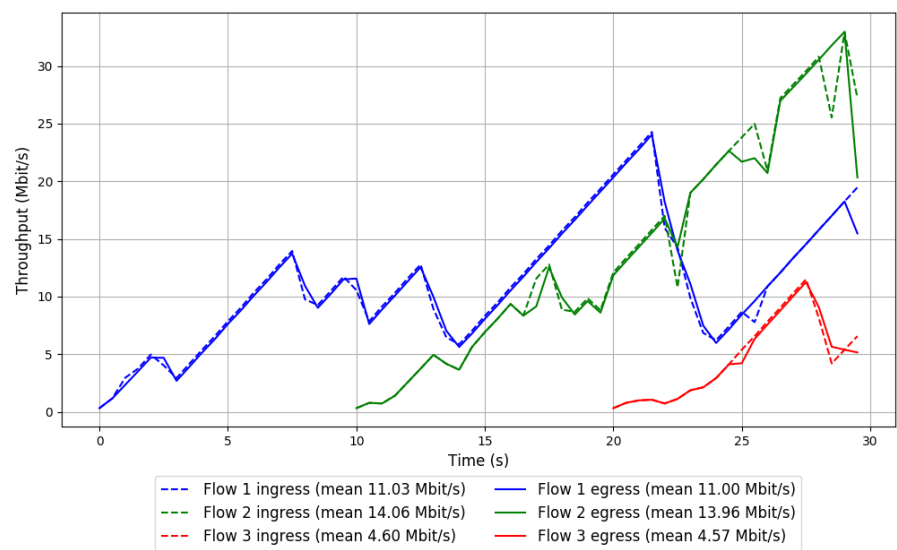
Run 4: Report of LEDBAT — Data Link

```
Run 5: Statistics of LEDBAT

Start at: 2017-09-18 23:14:39
End at: 2017-09-18 23:15:09


# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 22.80 Mbit/s
95th percentile per-packet one-way delay: 51.178 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 9.17 Mbit/s
95th percentile per-packet one-way delay: 51.085 ms
Loss rate: 0.97%
-- Flow 2:
Average throughput: 14.96 Mbit/s
95th percentile per-packet one-way delay: 51.389 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 11.27 Mbit/s
95th percentile per-packet one-way delay: 50.900 ms
Loss rate: 2.07%
```

Run 5: Report of LEDBAT — Data Link

Flow 1 ingress (mean 9.23 Mbit/s)   Flow 1 egress (mean 9.17 Mbit/s)
Flow 2 ingress (mean 14.93 Mbit/s)   Flow 2 egress (mean 14.96 Mbit/s)
Flow 3 ingress (mean 11.39 Mbit/s)   Flow 3 egress (mean 11.27 Mbit/s)

Flow 1 (95th percentile 51.09 ms)   Flow 2 (95th percentile 51.39 ms)   Flow 3 (95th percentile 50.90 ms)

```
Run 6: Statistics of LEDBAT

Start at: 2017-09-18 23:23:53
End at: 2017-09-18 23:24:23

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 25.61 Mbit/s
95th percentile per-packet one-way delay: 51.098 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 13.03 Mbit/s
95th percentile per-packet one-way delay: 51.145 ms
Loss rate: 0.50%
-- Flow 2:
Average throughput: 15.27 Mbit/s
95th percentile per-packet one-way delay: 51.027 ms
Loss rate: 0.55%
-- Flow 3:
Average throughput: 7.50 Mbit/s
95th percentile per-packet one-way delay: 50.757 ms
Loss rate: 2.52%
```
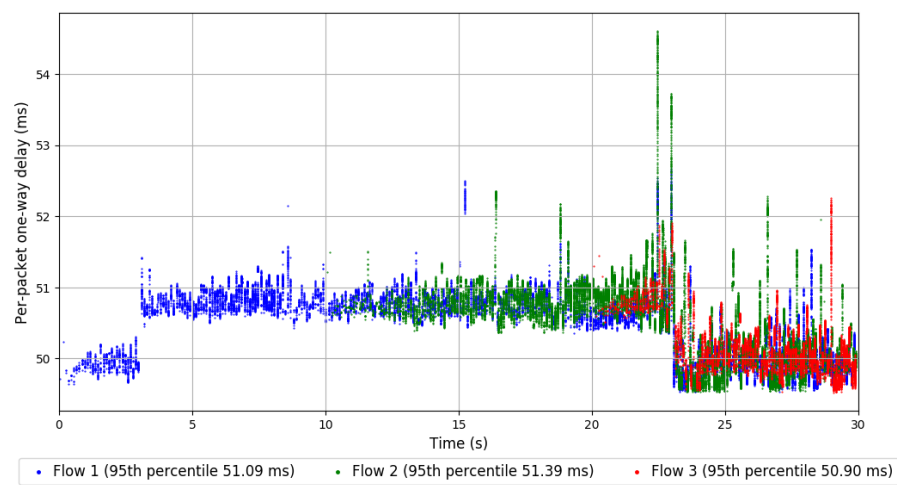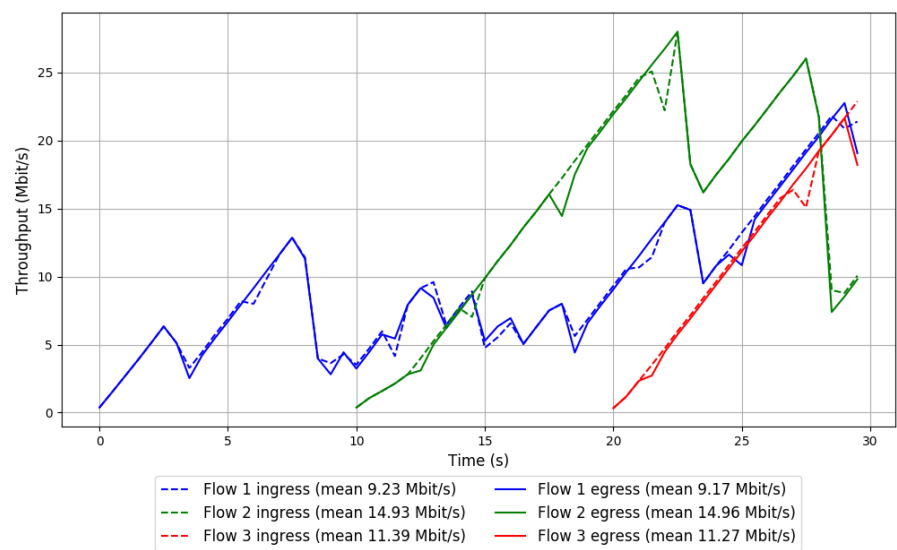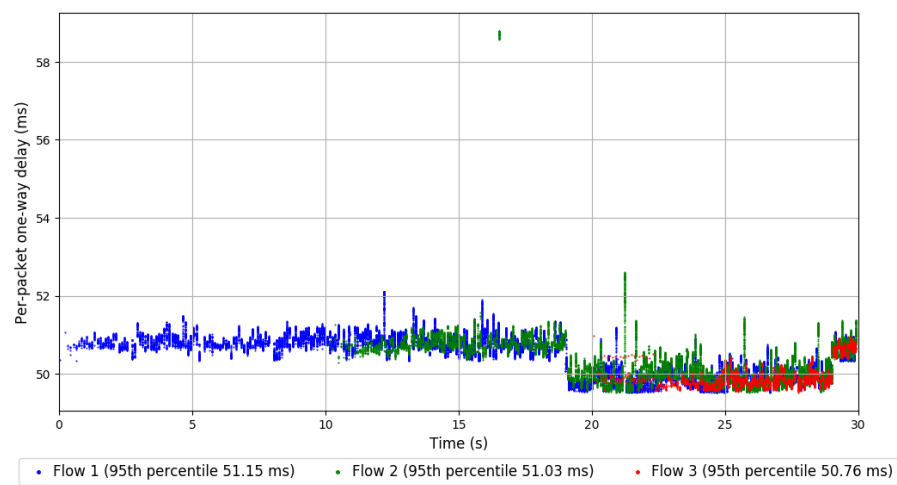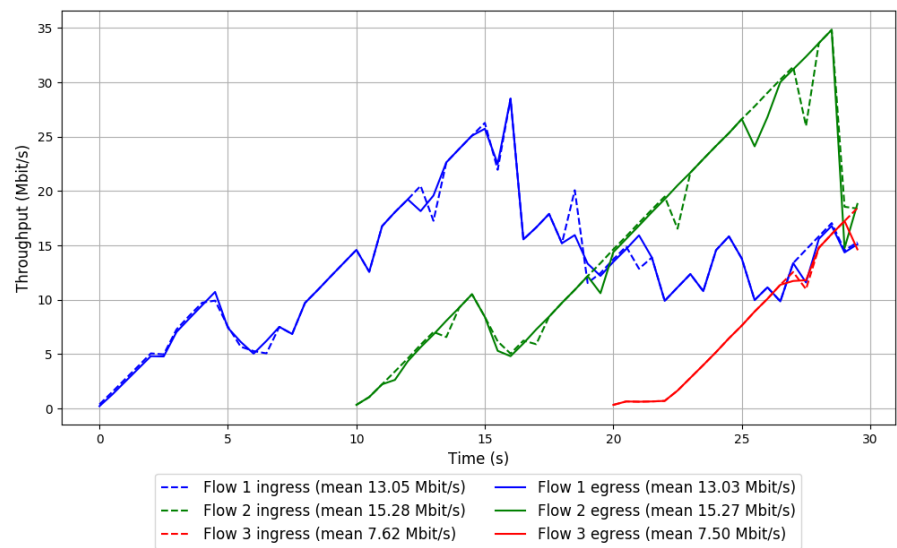
Run 6: Report of LEDBAT — Data Link

```
Run 7: Statistics of LEDBAT

Start at: 2017-09-18 23:33:10
End at: 2017-09-18 23:33:40

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 22.32 Mbit/s
95th percentile per-packet one-way delay: 50.333 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 12.02 Mbit/s
95th percentile per-packet one-way delay: 50.339 ms
Loss rate: 0.87%
-- Flow 2:
Average throughput: 10.42 Mbit/s
95th percentile per-packet one-way delay: 50.288 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 10.33 Mbit/s
95th percentile per-packet one-way delay: 50.504 ms
Loss rate: 0.73%
```

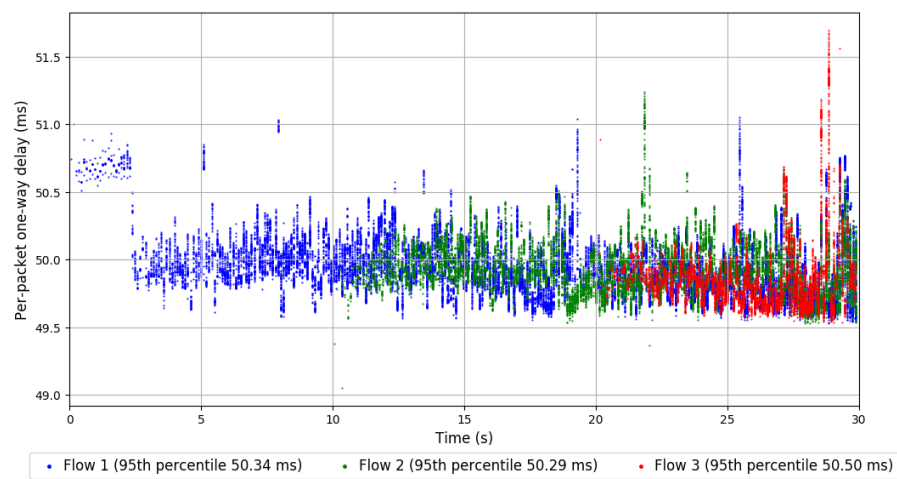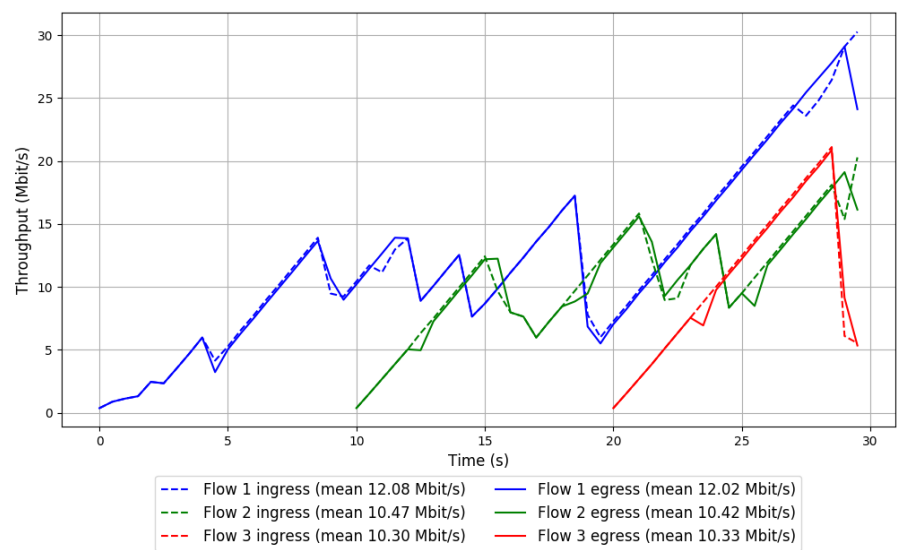# Run 7: Report of LEDBAT — Data Link

```
Run 8: Statistics of LEDBAT

Start at: 2017-09-18 23:42:23
End at: 2017-09-18 23:42:53

# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 23.56 Mbit/s
95th percentile per-packet one-way delay: 51.258 ms
Loss rate: 0.95%
-- Flow 1:
Average throughput: 11.96 Mbit/s
95th percentile per-packet one-way delay: 51.296 ms
Loss rate: 0.49%
-- Flow 2:
Average throughput: 14.80 Mbit/s
95th percentile per-packet one-way delay: 51.189 ms
Loss rate: 1.14%
-- Flow 3:
Average throughput: 5.48 Mbit/s
95th percentile per-packet one-way delay: 51.043 ms
Loss rate: 2.91%
```

Run 8: Report of LEDBAT — Data Link

Flow 1 ingress (mean 11.97 Mbit/s)   Flow 1 egress (mean 11.96 Mbit/s)
Flow 2 ingress (mean 14.89 Mbit/s)   Flow 2 egress (mean 14.80 Mbit/s)
Flow 3 ingress (mean 5.58 Mbit/s)   Flow 3 egress (mean 5.48 Mbit/s)

Flow 1 (95th percentile 51.30 ms)   Flow 2 (95th percentile 51.19 ms)   Flow 3 (95th percentile 51.04 ms)

79

```
Run 9: Statistics of LEDBAT

Start at: 2017-09-18 23:51:36
End at: 2017-09-18 23:52:06


# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 25.53 Mbit/s
95th percentile per-packet one-way delay: 50.878 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 14.59 Mbit/s
95th percentile per-packet one-way delay: 50.803 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 13.52 Mbit/s
95th percentile per-packet one-way delay: 50.994 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 6.02 Mbit/s
95th percentile per-packet one-way delay: 50.790 ms
Loss rate: 2.06%
```
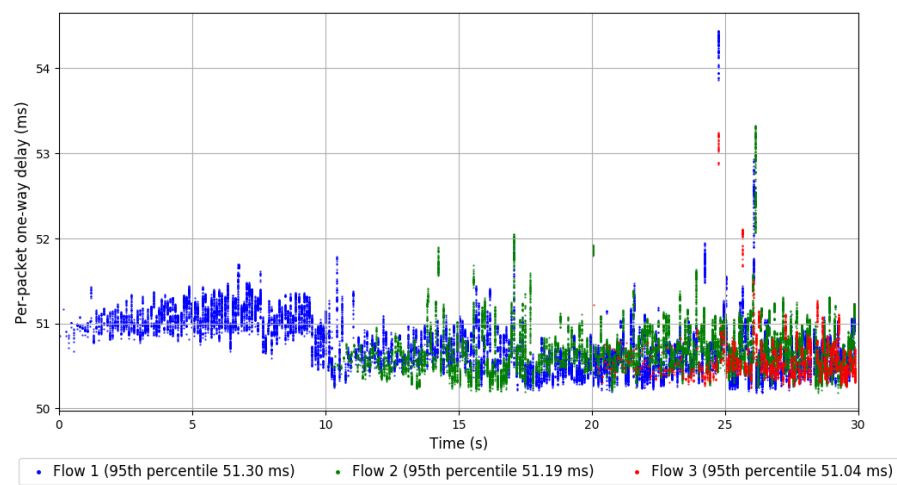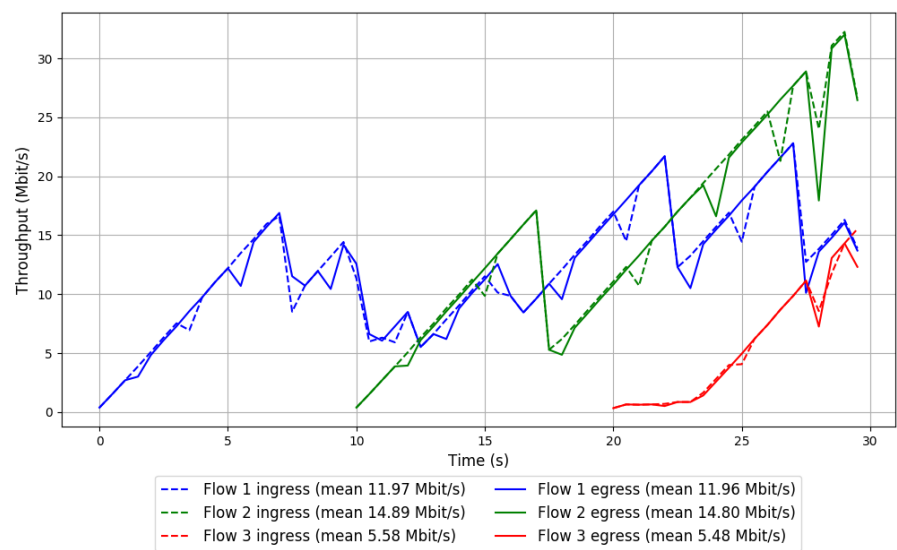
Run 9: Report of LEDBAT — Data Link

Flow 1 ingress (mean 14.67 Mbit/s) — Flow 1 egress (mean 14.59 Mbit/s)
Flow 2 ingress (mean 13.54 Mbit/s) — Flow 2 egress (mean 13.52 Mbit/s)
Flow 3 ingress (mean 6.08 Mbit/s) — Flow 3 egress (mean 6.02 Mbit/s)

Flow 1 (95th percentile 50.80 ms) — Flow 2 (95th percentile 50.99 ms) — Flow 3 (95th percentile 50.79 ms)

```
Run 10: Statistics of LEDBAT

Start at: 2017-09-19 00:00:41
End at: 2017-09-19 00:01:11


# Below is generated by plot.py at 2017-09-19 02:17:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 23.64 Mbit/s
95th percentile per-packet one-way delay: 50.341 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 11.27 Mbit/s
95th percentile per-packet one-way delay: 50.268 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 13.53 Mbit/s
95th percentile per-packet one-way delay: 50.381 ms
Loss rate: 0.67%
-- Flow 3:
Average throughput: 10.37 Mbit/s
95th percentile per-packet one-way delay: 50.390 ms
Loss rate: 1.38%
```
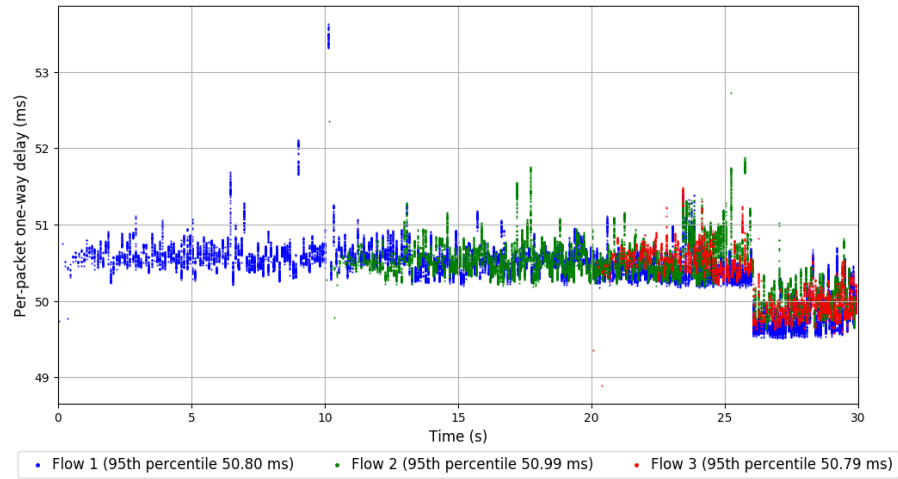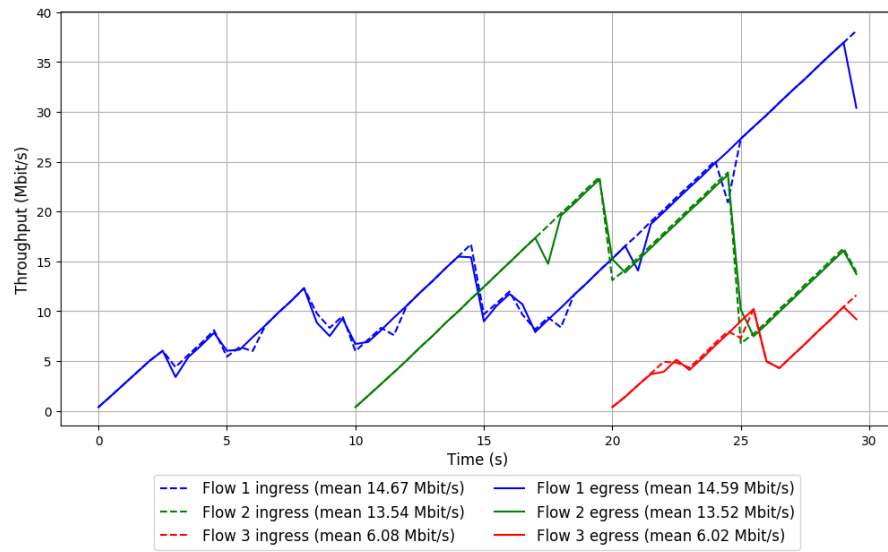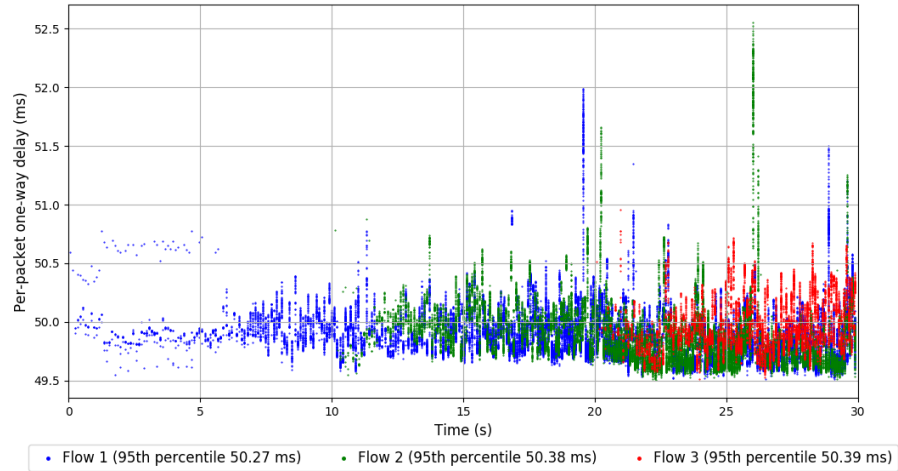
Run 10: Report of LEDBAT — Data Link

- - - Flow 1 ingress (mean 11.33 Mbit/s) —— Flow 1 egress (mean 11.27 Mbit/s)
- - - Flow 2 ingress (mean 13.55 Mbit/s) —— Flow 2 egress (mean 13.53 Mbit/s)
- - - Flow 3 ingress (mean 10.41 Mbit/s) —— Flow 3 egress (mean 10.37 Mbit/s)

• Flow 1 (95th percentile 50.27 ms)   • Flow 2 (95th percentile 50.38 ms)   • Flow 3 (95th percentile 50.39 ms)

83

```
Run 1: Statistics of PCC

Start at: 2017-09-18 22:35:04
End at: 2017-09-18 22:35:34


# Below is generated by plot.py at 2017-09-19 02:21:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 440.47 Mbit/s
95th percentile per-packet one-way delay: 93.559 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 7.30 Mbit/s
95th percentile per-packet one-way delay: 88.852 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 643.06 Mbit/s
95th percentile per-packet one-way delay: 93.876 ms
Loss rate: 0.92%
-- Flow 3:
Average throughput: 19.91 Mbit/s
95th percentile per-packet one-way delay: 92.712 ms
Loss rate: 2.12%
```
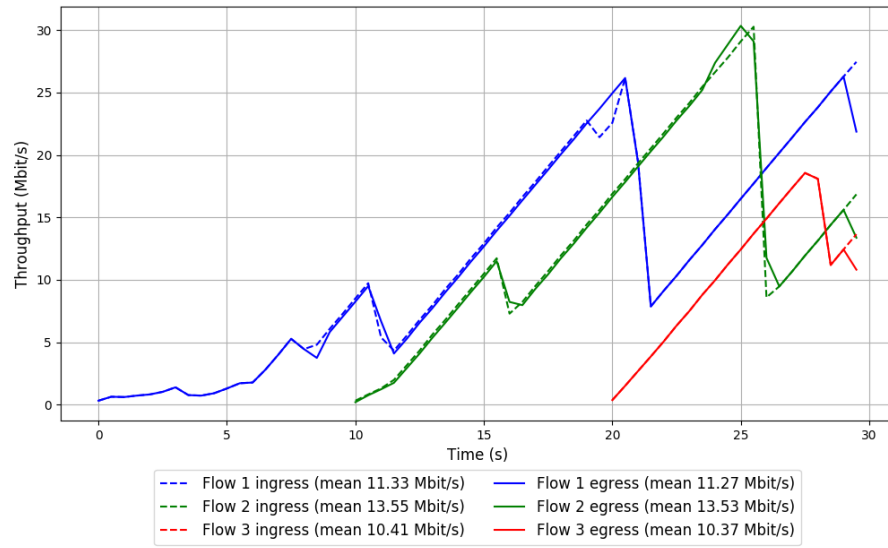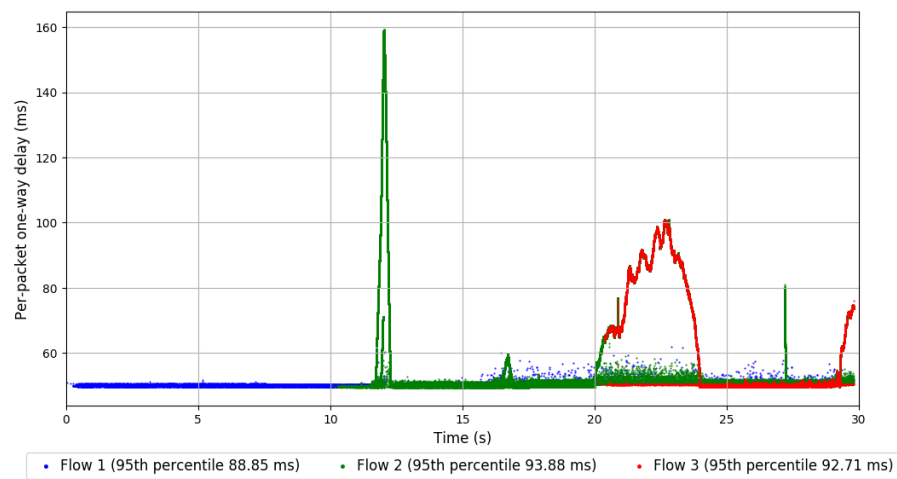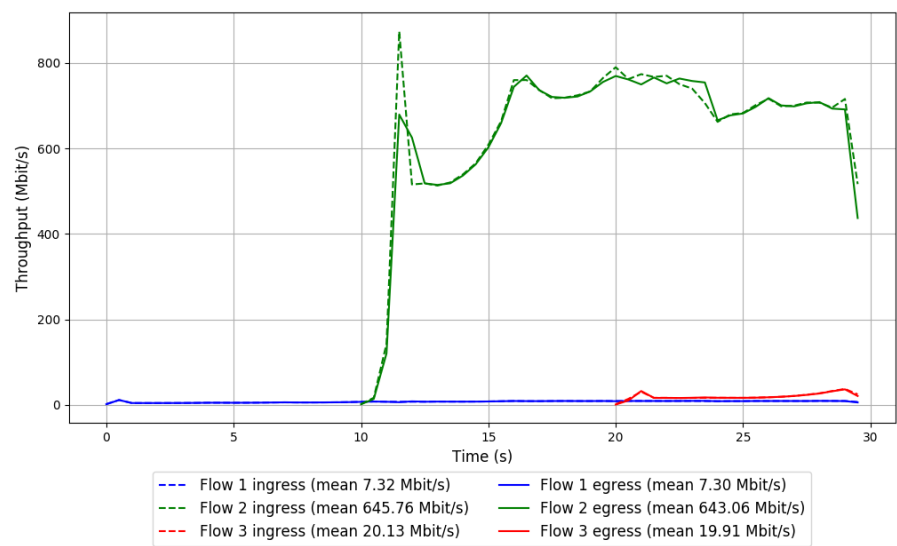
Run 1: Report of PCC — Data Link

- - - Flow 1 ingress (mean 7.32 Mbit/s) ——— Flow 1 egress (mean 7.30 Mbit/s)
- - - Flow 2 ingress (mean 645.76 Mbit/s) ——— Flow 2 egress (mean 643.06 Mbit/s)
- - - Flow 3 ingress (mean 20.13 Mbit/s) ——— Flow 3 egress (mean 19.91 Mbit/s)

• Flow 1 (95th percentile 88.85 ms)   • Flow 2 (95th percentile 93.88 ms)   • Flow 3 (95th percentile 92.71 ms)
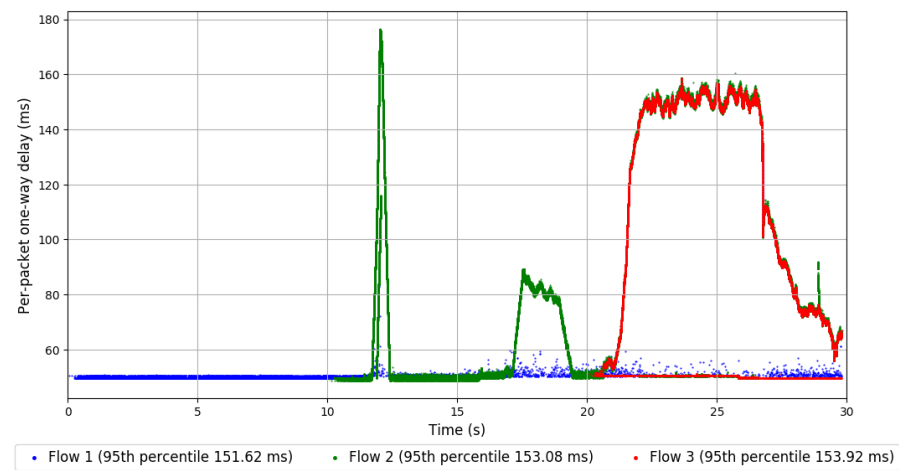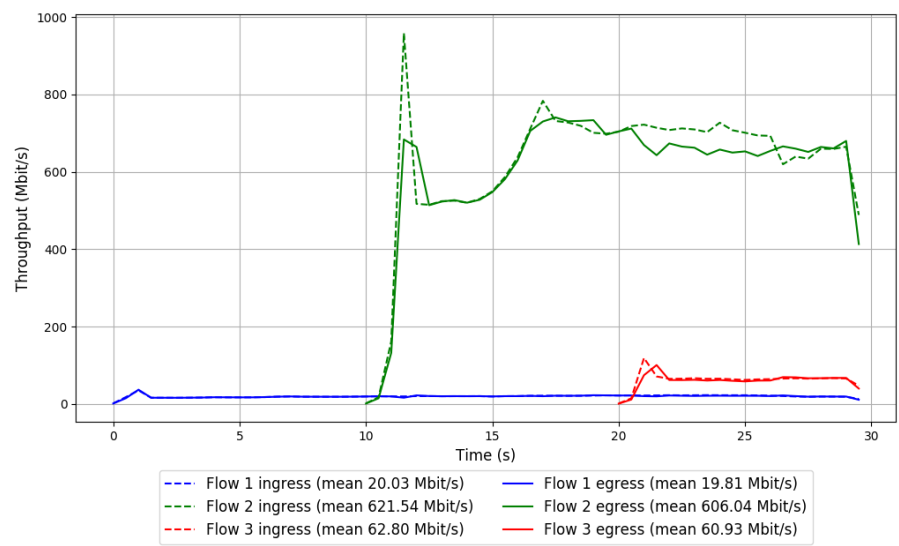
85

```
Run 2: Statistics of PCC

Start at: 2017-09-18 22:44:16
End at: 2017-09-18 22:44:46

# Below is generated by plot.py at 2017-09-19 02:21:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 442.13 Mbit/s
95th percentile per-packet one-way delay: 153.099 ms
Loss rate: 2.96%
-- Flow 1:
Average throughput: 19.81 Mbit/s
95th percentile per-packet one-way delay: 151.617 ms
Loss rate: 1.45%
-- Flow 2:
Average throughput: 606.04 Mbit/s
95th percentile per-packet one-way delay: 153.077 ms
Loss rate: 2.98%
-- Flow 3:
Average throughput: 60.93 Mbit/s
95th percentile per-packet one-way delay: 153.916 ms
Loss rate: 3.98%
```

Run 2: Report of PCC — Data Link

- - - Flow 1 ingress (mean 20.03 Mbit/s) —— Flow 1 egress (mean 19.81 Mbit/s)
- - - Flow 2 ingress (mean 621.54 Mbit/s) —— Flow 2 egress (mean 606.04 Mbit/s)
- - - Flow 3 ingress (mean 62.80 Mbit/s) —— Flow 3 egress (mean 60.93 Mbit/s)

- Flow 1 (95th percentile 151.62 ms) • Flow 2 (95th percentile 153.08 ms) • Flow 3 (95th percentile 153.92 ms)

```
Run 3: Statistics of PCC

Start at: 2017-09-18 22:53:29
End at: 2017-09-18 22:53:59


# Below is generated by plot.py at 2017-09-19 02:26:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 685.73 Mbit/s
95th percentile per-packet one-way delay: 113.089 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 651.91 Mbit/s
95th percentile per-packet one-way delay: 111.348 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 18.71 Mbit/s
95th percentile per-packet one-way delay: 115.088 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 65.39 Mbit/s
95th percentile per-packet one-way delay: 120.439 ms
Loss rate: 1.15%
```
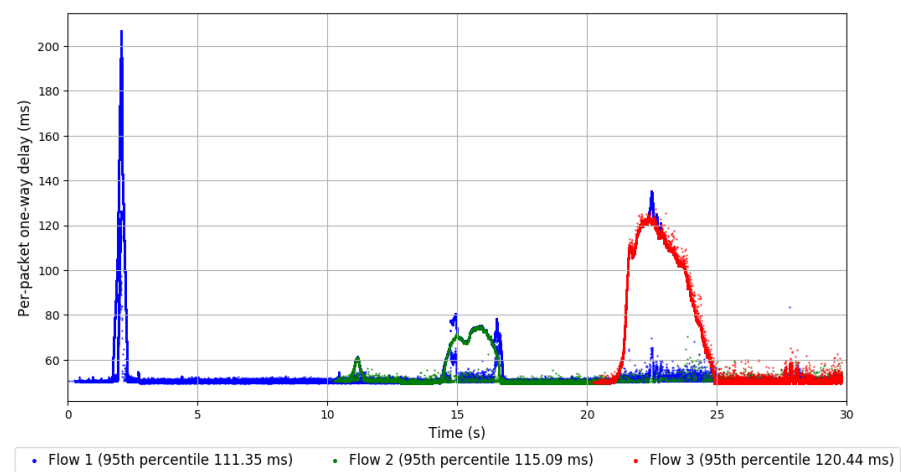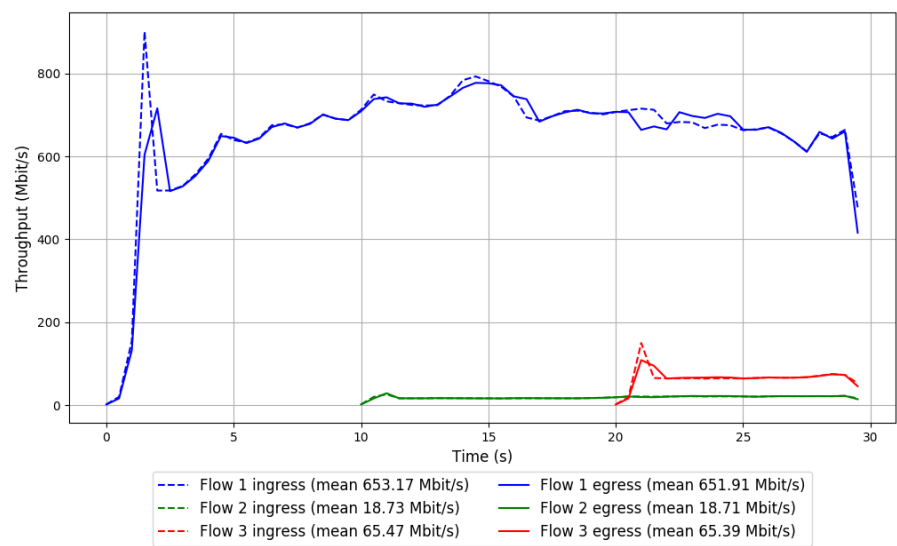
Run 3: Report of PCC — Data Link

89

```
Run 4: Statistics of PCC

Start at: 2017-09-18 23:02:34
End at: 2017-09-18 23:03:04

# Below is generated by plot.py at 2017-09-19 02:26:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 681.90 Mbit/s
95th percentile per-packet one-way delay: 127.435 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 623.06 Mbit/s
95th percentile per-packet one-way delay: 127.908 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 86.65 Mbit/s
95th percentile per-packet one-way delay: 121.631 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 64.596 ms
Loss rate: 0.95%
```
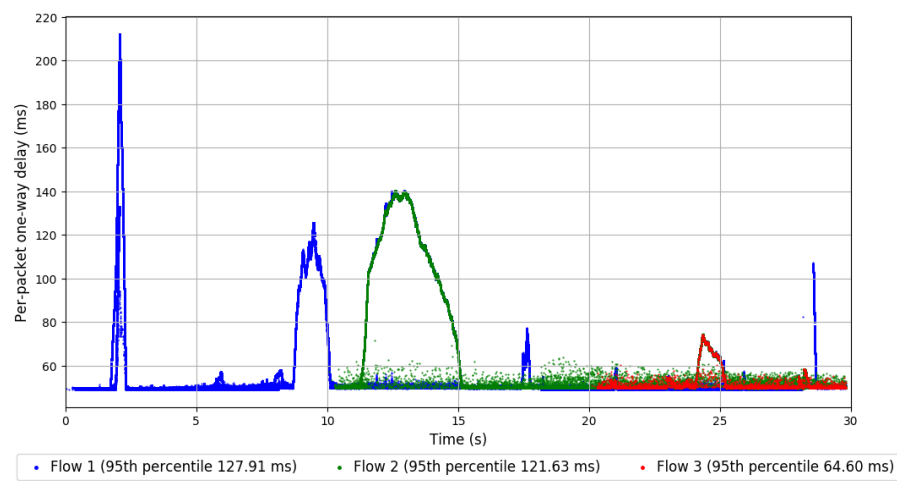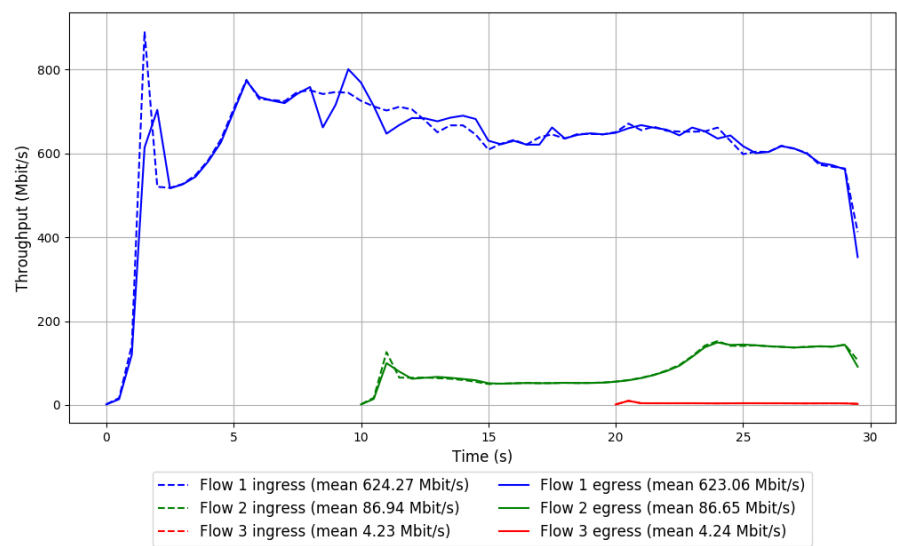
Run 4: Report of PCC — Data Link

Flow 1 ingress (mean 624.27 Mbit/s) — Flow 1 egress (mean 623.06 Mbit/s)
Flow 2 ingress (mean 86.94 Mbit/s) — Flow 2 egress (mean 86.65 Mbit/s)
Flow 3 ingress (mean 4.23 Mbit/s) — Flow 3 egress (mean 4.24 Mbit/s)

Flow 1 (95th percentile 127.91 ms) • Flow 2 (95th percentile 121.63 ms) • Flow 3 (95th percentile 64.60 ms)

```
Run 5: Statistics of PCC

Start at: 2017-09-18 23:12:00
End at: 2017-09-18 23:12:30


# Below is generated by plot.py at 2017-09-19 02:26:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 693.25 Mbit/s
95th percentile per-packet one-way delay: 158.089 ms
Loss rate: 3.36%
-- Flow 1:
Average throughput: 579.40 Mbit/s
95th percentile per-packet one-way delay: 165.655 ms
Loss rate: 3.46%
-- Flow 2:
Average throughput: 111.52 Mbit/s
95th percentile per-packet one-way delay: 149.975 ms
Loss rate: 3.75%
-- Flow 3:
Average throughput: 122.04 Mbit/s
95th percentile per-packet one-way delay: 132.662 ms
Loss rate: 1.17%
```
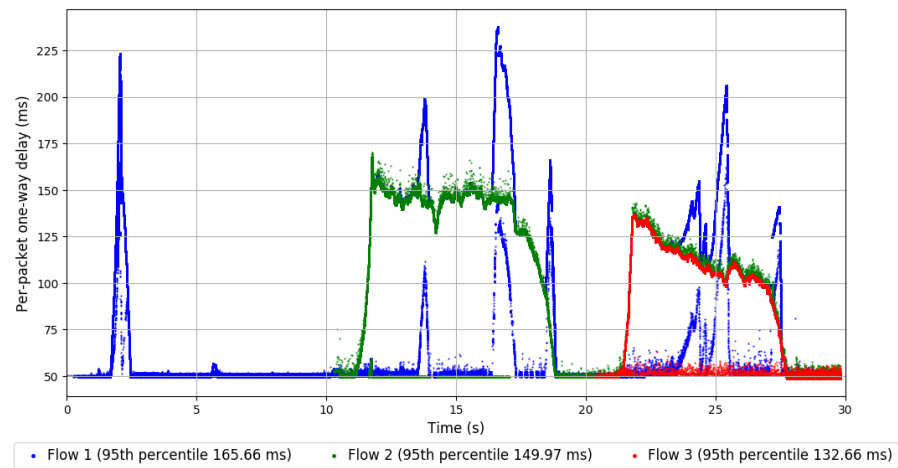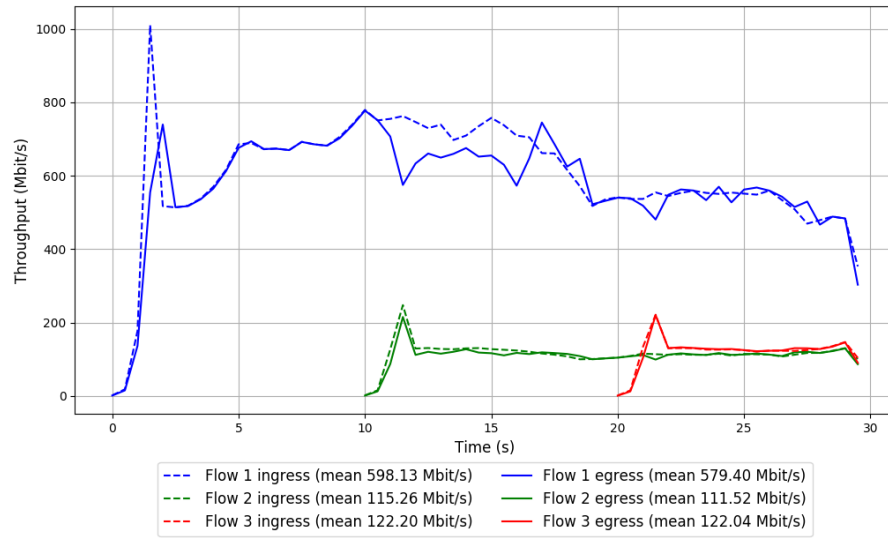
Run 5: Report of PCC — Data Link

- - - Flow 1 ingress (mean 598.13 Mbit/s)   —— Flow 1 egress (mean 579.40 Mbit/s)
- - - Flow 2 ingress (mean 115.26 Mbit/s)   —— Flow 2 egress (mean 111.52 Mbit/s)
- - - Flow 3 ingress (mean 122.20 Mbit/s)   —— Flow 3 egress (mean 122.04 Mbit/s)

- Flow 1 (95th percentile 165.66 ms)   • Flow 2 (95th percentile 149.97 ms)   • Flow 3 (95th percentile 132.66 ms)

93

```
Run 6: Statistics of PCC

Start at: 2017-09-18 23:21:12
End at: 2017-09-18 23:21:42


# Below is generated by plot.py at 2017-09-19 02:26:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 691.12 Mbit/s
95th percentile per-packet one-way delay: 151.543 ms
Loss rate: 2.72%
-- Flow 1:
Average throughput: 629.65 Mbit/s
95th percentile per-packet one-way delay: 151.584 ms
Loss rate: 2.75%
-- Flow 2:
Average throughput: 62.20 Mbit/s
95th percentile per-packet one-way delay: 151.806 ms
Loss rate: 2.92%
-- Flow 3:
Average throughput: 61.97 Mbit/s
95th percentile per-packet one-way delay: 79.175 ms
Loss rate: 1.11%
```
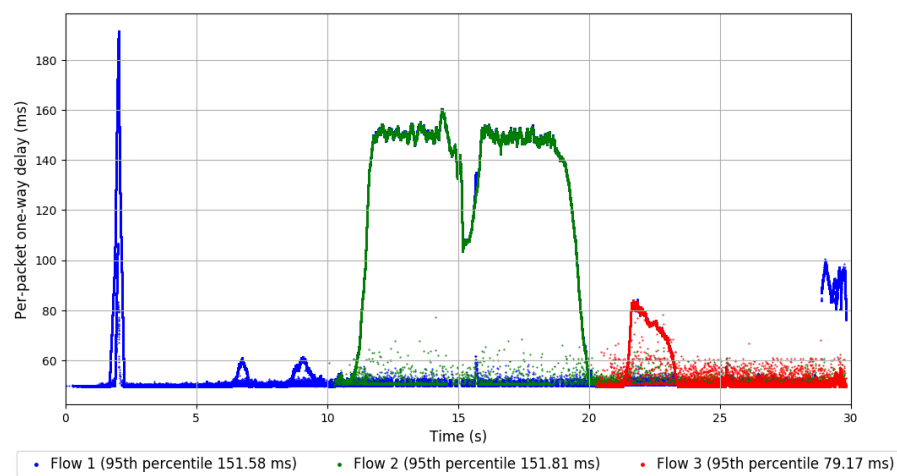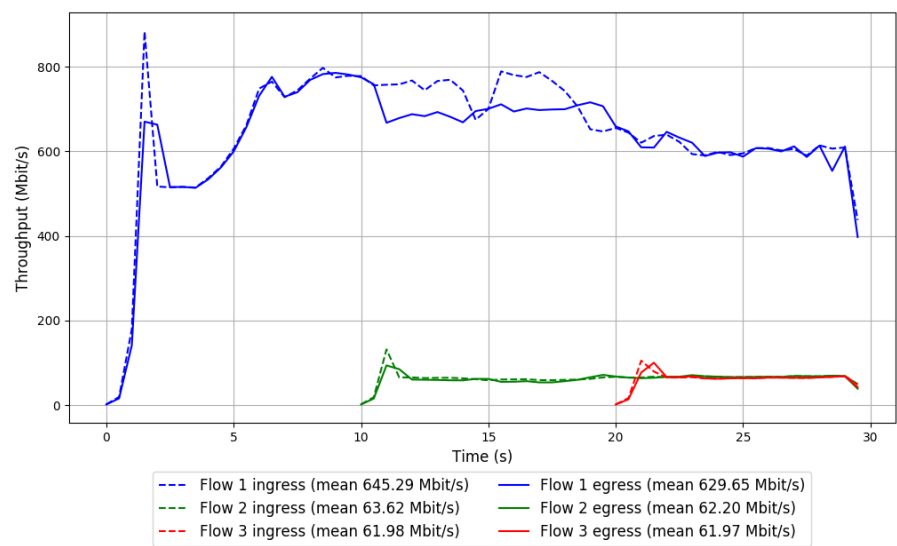
Run 6: Report of PCC — Data Link

Flow 1 ingress (mean 645.29 Mbit/s)   Flow 1 egress (mean 629.65 Mbit/s)
Flow 2 ingress (mean 63.62 Mbit/s)   Flow 2 egress (mean 62.20 Mbit/s)
Flow 3 ingress (mean 61.98 Mbit/s)   Flow 3 egress (mean 61.97 Mbit/s)

Flow 1 (95th percentile 151.58 ms)   Flow 2 (95th percentile 151.81 ms)   Flow 3 (95th percentile 79.17 ms)

```
Run 7: Statistics of PCC

Start at: 2017-09-18 23:30:29
End at: 2017-09-18 23:30:59


# Below is generated by plot.py at 2017-09-19 02:27:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 686.89 Mbit/s
95th percentile per-packet one-way delay: 150.798 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 630.64 Mbit/s
95th percentile per-packet one-way delay: 150.720 ms
Loss rate: 1.61%
-- Flow 2:
Average throughput: 69.09 Mbit/s
95th percentile per-packet one-way delay: 151.638 ms
Loss rate: 1.88%
-- Flow 3:
Average throughput: 31.90 Mbit/s
95th percentile per-packet one-way delay: 150.368 ms
Loss rate: 2.21%
```
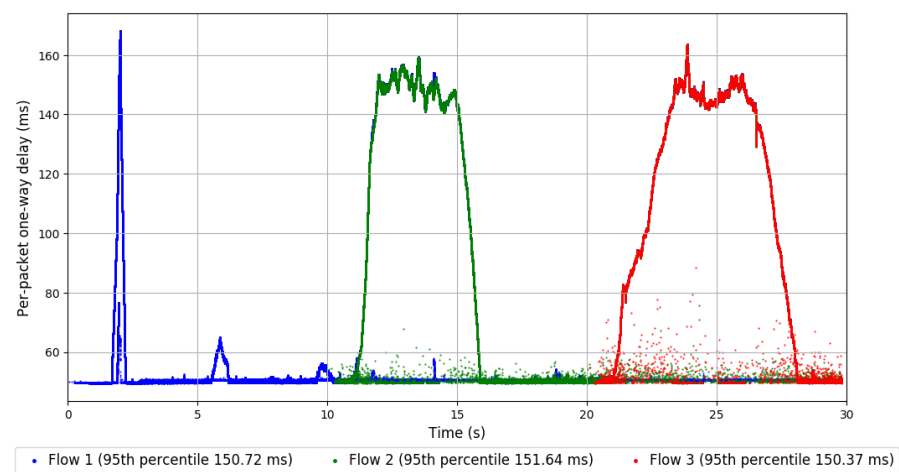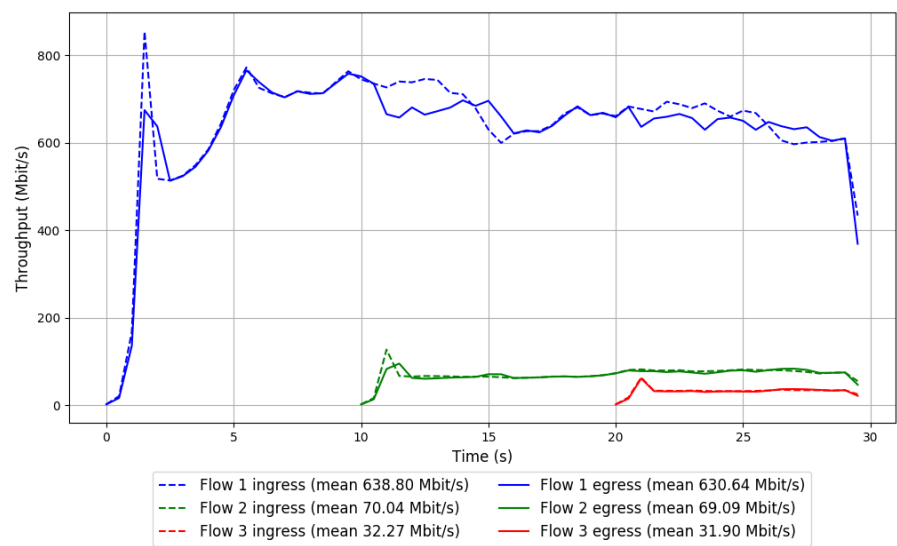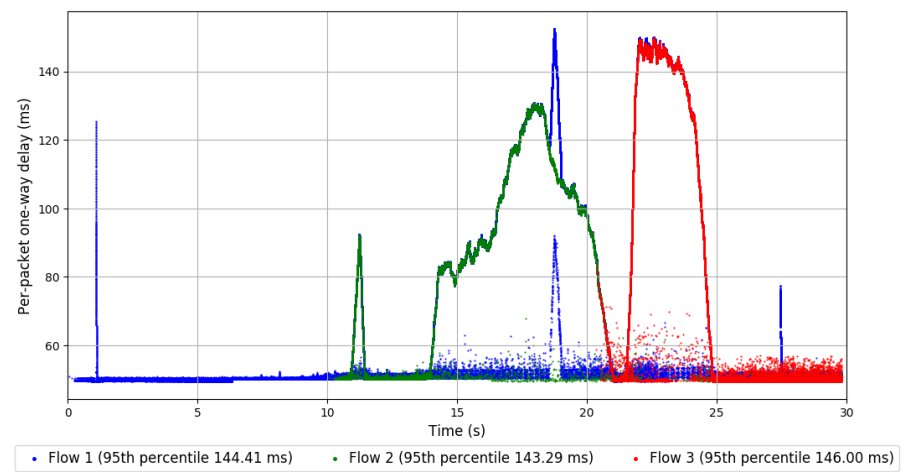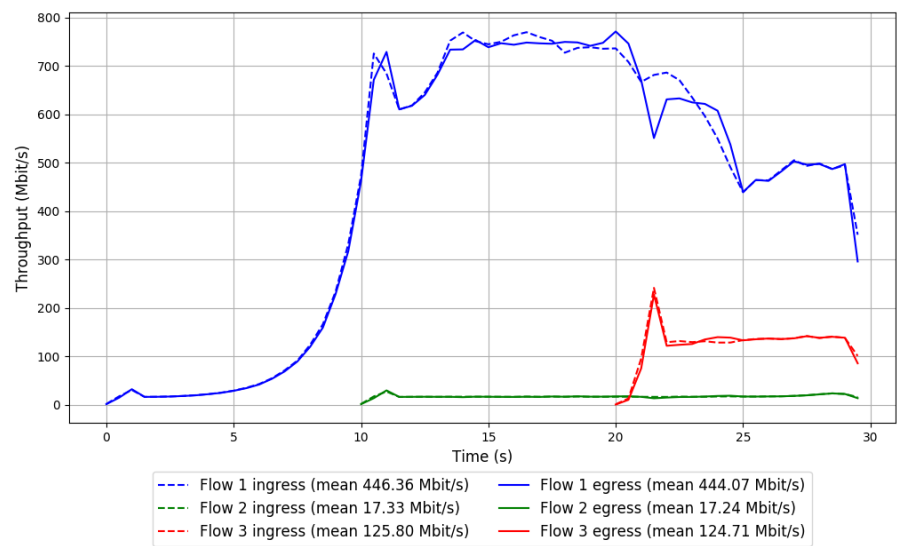
Run 7: Report of PCC — Data Link

Flow 1 ingress (mean 638.80 Mbit/s) — — — — Flow 1 egress (mean 630.64 Mbit/s)
Flow 2 ingress (mean 70.04 Mbit/s) — — — — Flow 2 egress (mean 69.09 Mbit/s)
Flow 3 ingress (mean 32.27 Mbit/s) — — — — Flow 3 egress (mean 31.90 Mbit/s)

Flow 1 (95th percentile 150.72 ms) Flow 2 (95th percentile 151.64 ms) Flow 3 (95th percentile 150.37 ms)

97

```
Run 8: Statistics of PCC

Start at: 2017-09-18 23:39:36
End at: 2017-09-18 23:40:06


# Below is generated by plot.py at 2017-09-19 02:27:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 496.21 Mbit/s
95th percentile per-packet one-way delay: 144.796 ms
Loss rate: 0.95%
-- Flow 1:
Average throughput: 444.07 Mbit/s
95th percentile per-packet one-way delay: 144.405 ms
Loss rate: 0.86%
-- Flow 2:
Average throughput: 17.24 Mbit/s
95th percentile per-packet one-way delay: 143.288 ms
Loss rate: 1.02%
-- Flow 3:
Average throughput: 124.71 Mbit/s
95th percentile per-packet one-way delay: 145.997 ms
Loss rate: 1.92%
```
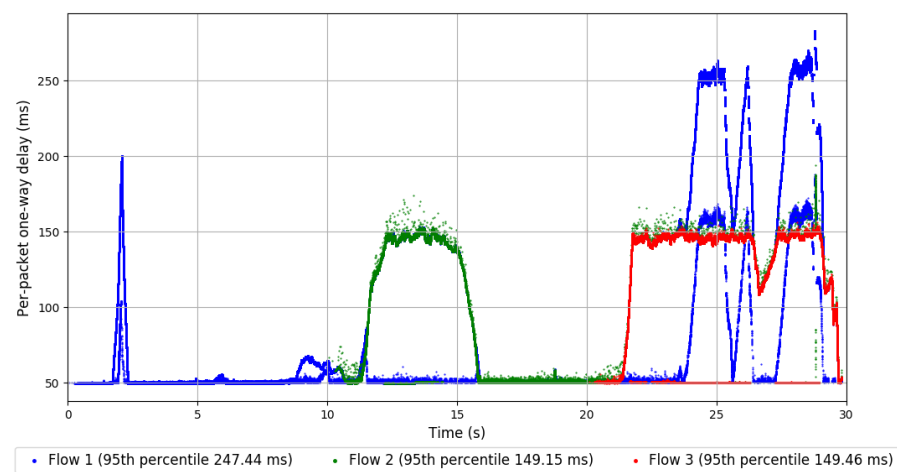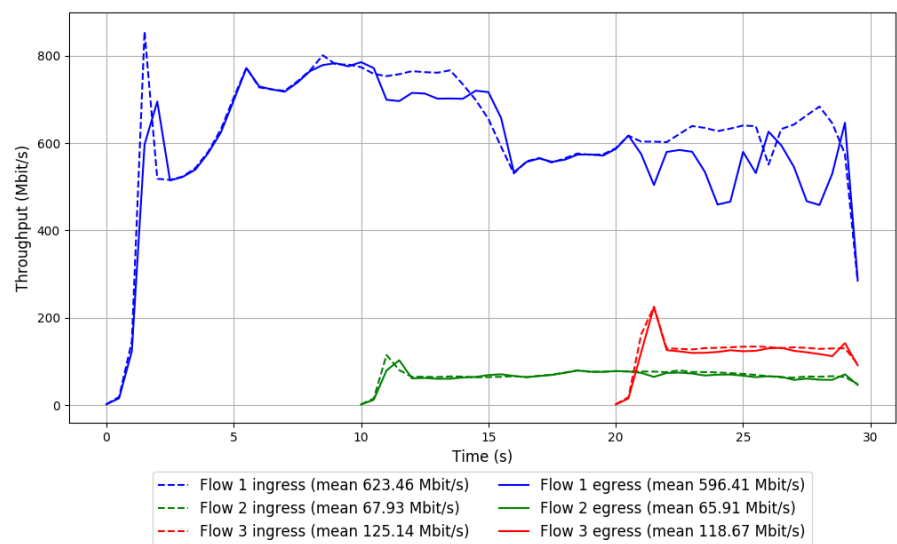
Run 8: Report of PCC — Data Link

- - - - Flow 1 ingress (mean 446.36 Mbit/s)   —— Flow 1 egress (mean 444.07 Mbit/s)
- - - - Flow 2 ingress (mean 17.33 Mbit/s)   —— Flow 2 egress (mean 17.24 Mbit/s)
- - - - Flow 3 ingress (mean 125.80 Mbit/s)   —— Flow 3 egress (mean 124.71 Mbit/s)

• Flow 1 (95th percentile 144.41 ms)   • Flow 2 (95th percentile 143.29 ms)   • Flow 3 (95th percentile 146.00 ms)
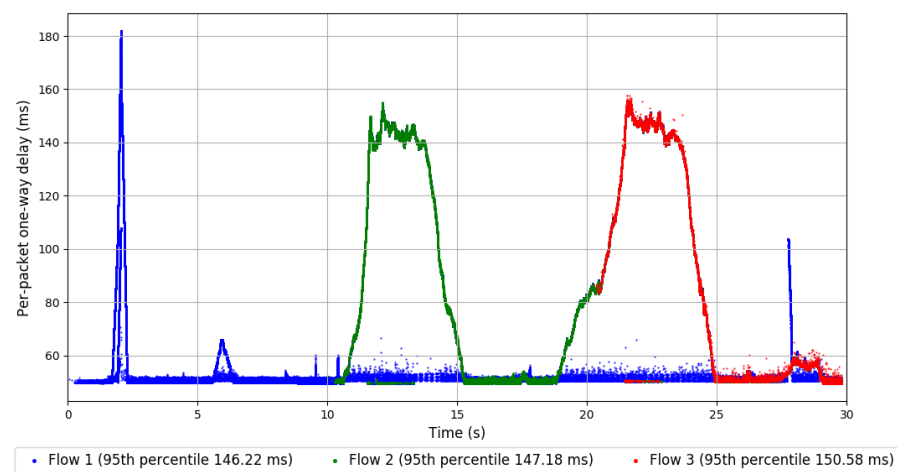
99

```
Run 9: Statistics of PCC

Start at: 2017-09-18 23:48:59
End at: 2017-09-18 23:49:29


# Below is generated by plot.py at 2017-09-19 02:34:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 678.89 Mbit/s
95th percentile per-packet one-way delay: 236.140 ms
Loss rate: 4.67%
-- Flow 1:
Average throughput: 596.41 Mbit/s
95th percentile per-packet one-way delay: 247.439 ms
Loss rate: 4.66%
-- Flow 2:
Average throughput: 65.91 Mbit/s
95th percentile per-packet one-way delay: 149.149 ms
Loss rate: 3.54%
-- Flow 3:
Average throughput: 118.67 Mbit/s
95th percentile per-packet one-way delay: 149.459 ms
Loss rate: 6.12%
```

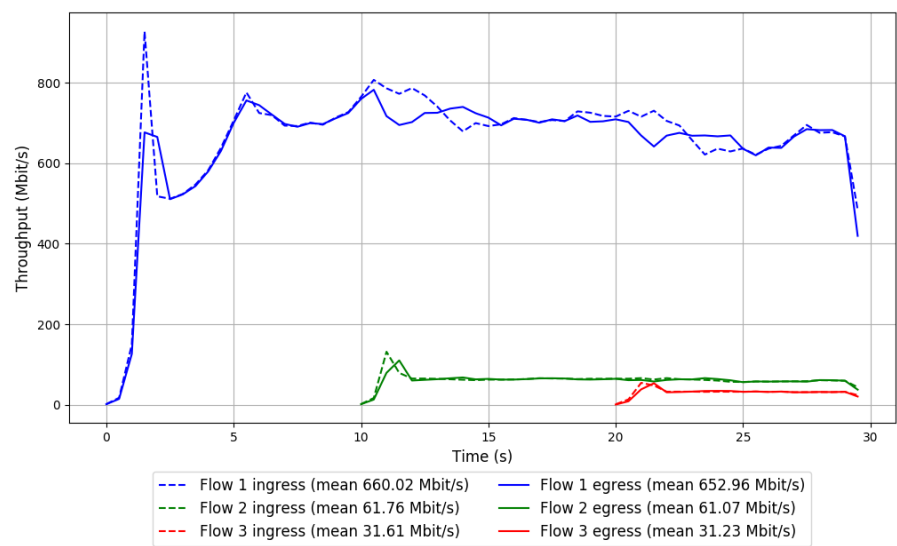Run 9: Report of PCC — Data Link

101

```
Run 10: Statistics of PCC

Start at: 2017-09-18 23:58:03
End at: 2017-09-18 23:58:33

# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 703.60 Mbit/s
95th percentile per-packet one-way delay: 146.454 ms
Loss rate: 1.43%
-- Flow 1:
Average throughput: 652.96 Mbit/s
95th percentile per-packet one-way delay: 146.221 ms
Loss rate: 1.40%
-- Flow 2:
Average throughput: 61.07 Mbit/s
95th percentile per-packet one-way delay: 147.179 ms
Loss rate: 1.62%
-- Flow 3:
Average throughput: 31.23 Mbit/s
95th percentile per-packet one-way delay: 150.578 ms
Loss rate: 2.54%
```
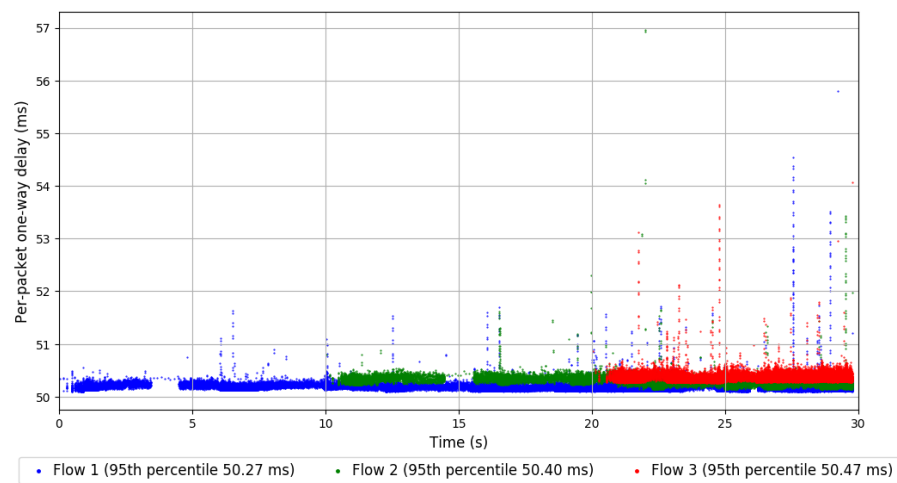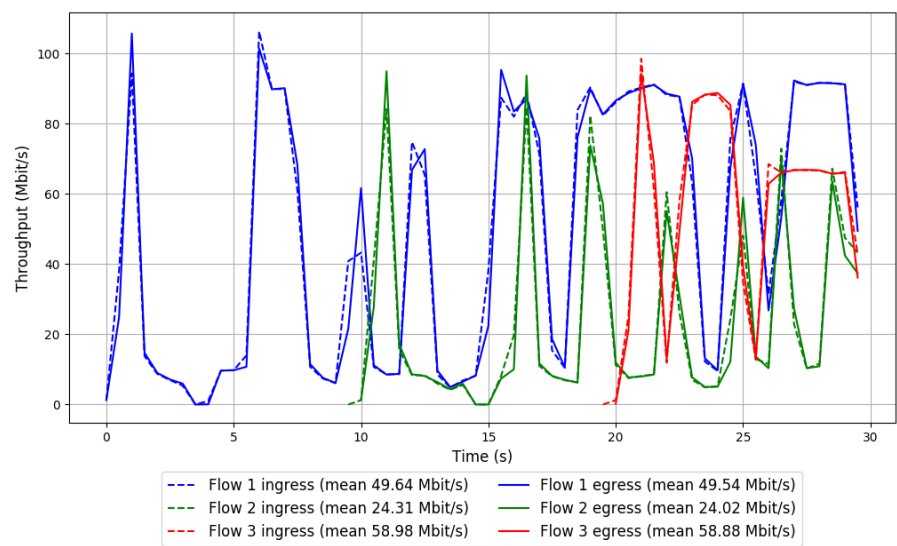
Run 10: Report of PCC — Data Link

Flow 1 ingress (mean 660.02 Mbit/s)   Flow 1 egress (mean 652.96 Mbit/s)
Flow 2 ingress (mean 61.76 Mbit/s)   Flow 2 egress (mean 61.07 Mbit/s)
Flow 3 ingress (mean 31.61 Mbit/s)   Flow 3 egress (mean 31.23 Mbit/s)

Flow 1 (95th percentile 146.22 ms)   Flow 2 (95th percentile 147.18 ms)   Flow 3 (95th percentile 150.58 ms)

103

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-09-18 22:36:01
End at: 2017-09-18 22:36:31


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 84.75 Mbit/s
95th percentile per-packet one-way delay: 50.406 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 49.54 Mbit/s
95th percentile per-packet one-way delay: 50.265 ms
Loss rate: 0.54%
-- Flow 2:
Average throughput: 24.02 Mbit/s
95th percentile per-packet one-way delay: 50.397 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 58.88 Mbit/s
95th percentile per-packet one-way delay: 50.467 ms
Loss rate: 1.17%
```
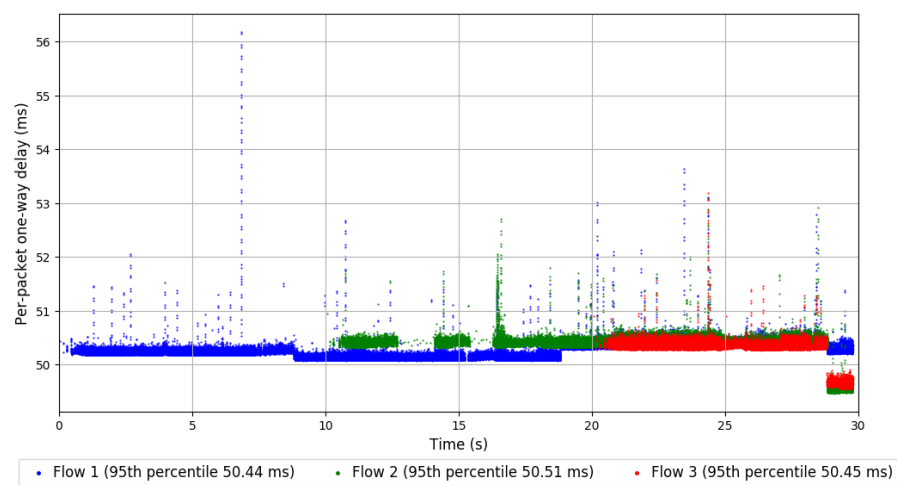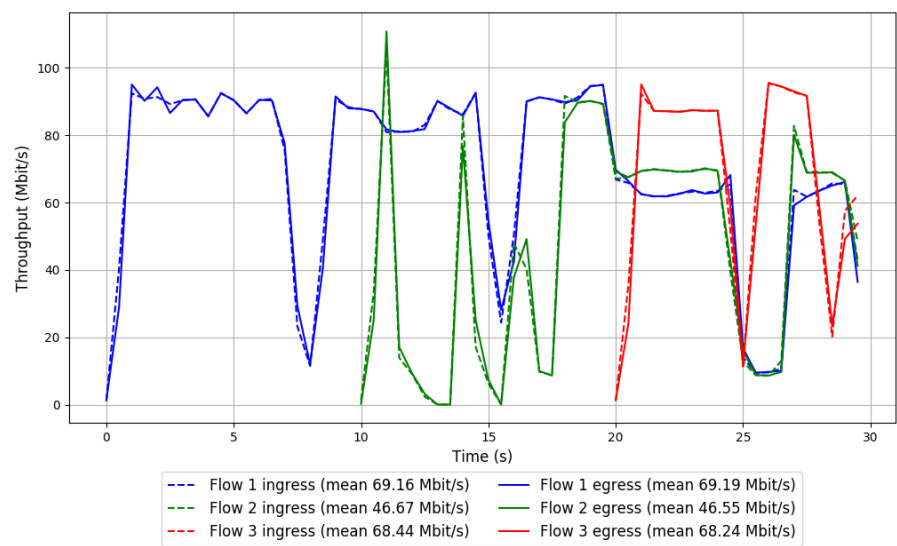
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2017-09-18 22:45:13
End at: 2017-09-18 22:45:43


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 122.38 Mbit/s
95th percentile per-packet one-way delay: 50.468 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 69.19 Mbit/s
95th percentile per-packet one-way delay: 50.435 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 46.55 Mbit/s
95th percentile per-packet one-way delay: 50.509 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 68.24 Mbit/s
95th percentile per-packet one-way delay: 50.446 ms
Loss rate: 1.33%
```
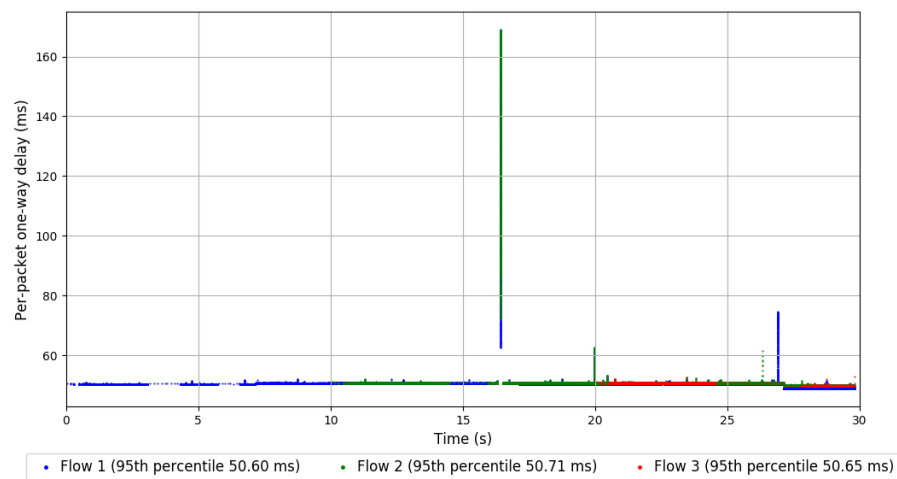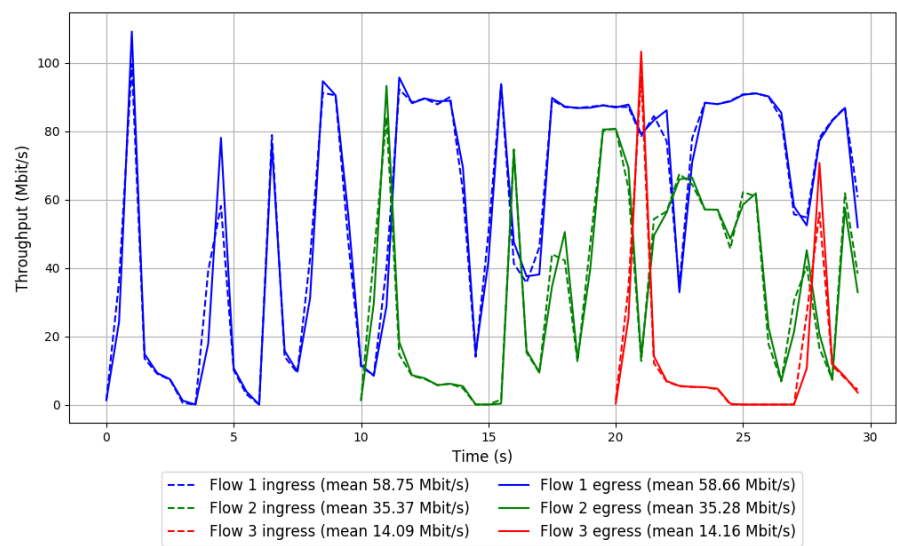
Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-09-18 22:54:35
End at: 2017-09-18 22:55:05


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 86.69 Mbit/s
95th percentile per-packet one-way delay: 50.655 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 58.66 Mbit/s
95th percentile per-packet one-way delay: 50.597 ms
Loss rate: 0.49%
-- Flow 2:
Average throughput: 35.28 Mbit/s
95th percentile per-packet one-way delay: 50.708 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 14.16 Mbit/s
95th percentile per-packet one-way delay: 50.650 ms
Loss rate: 0.49%
```
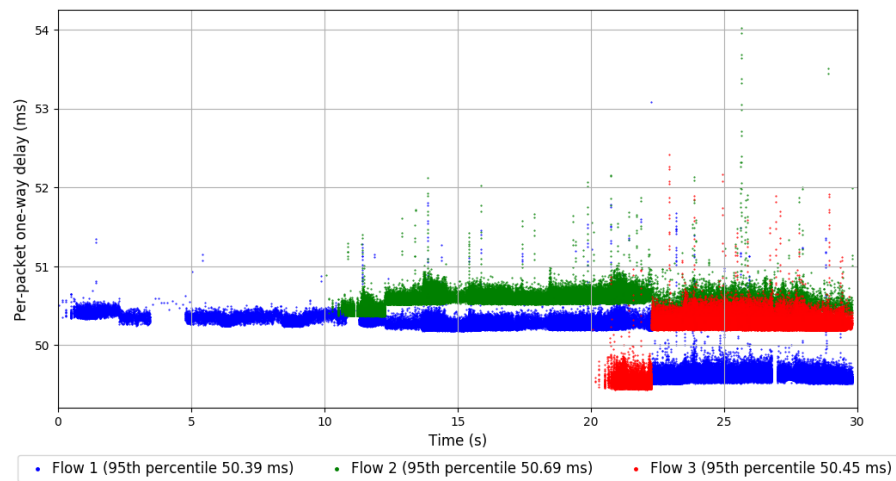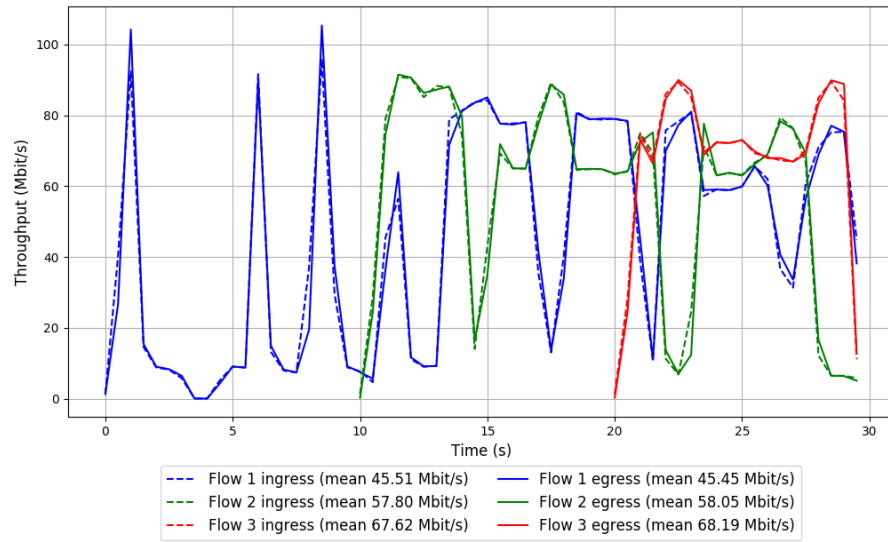
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 58.75 Mbit/s)   Flow 1 egress (mean 58.66 Mbit/s)
Flow 2 ingress (mean 35.37 Mbit/s)   Flow 2 egress (mean 35.28 Mbit/s)
Flow 3 ingress (mean 14.09 Mbit/s)   Flow 3 egress (mean 14.16 Mbit/s)

Flow 1 (95th percentile 50.60 ms)   Flow 2 (95th percentile 50.71 ms)   Flow 3 (95th percentile 50.65 ms)

```
Run 4: Statistics of QUIC Cubic

Start at: 2017-09-18 23:03:40
End at: 2017-09-18 23:04:10

# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 106.27 Mbit/s
95th percentile per-packet one-way delay: 50.638 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 45.45 Mbit/s
95th percentile per-packet one-way delay: 50.394 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 58.05 Mbit/s
95th percentile per-packet one-way delay: 50.693 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 68.19 Mbit/s
95th percentile per-packet one-way delay: 50.451 ms
Loss rate: 0.18%
```
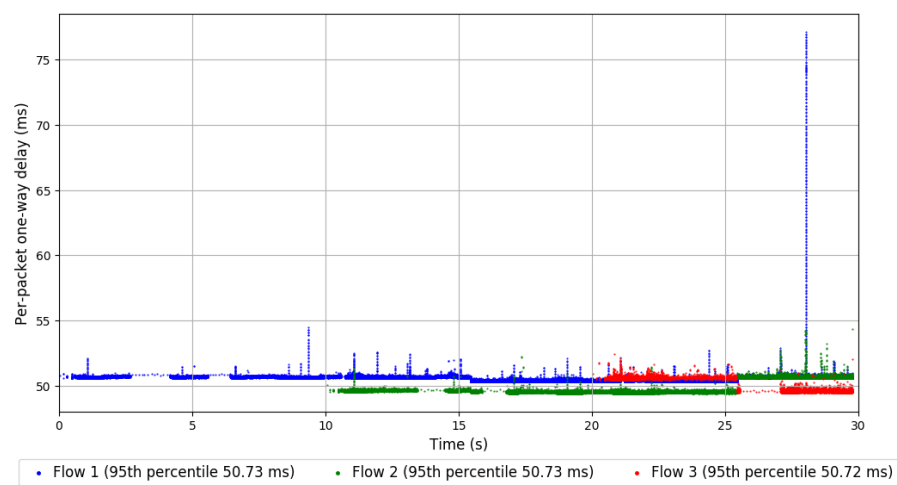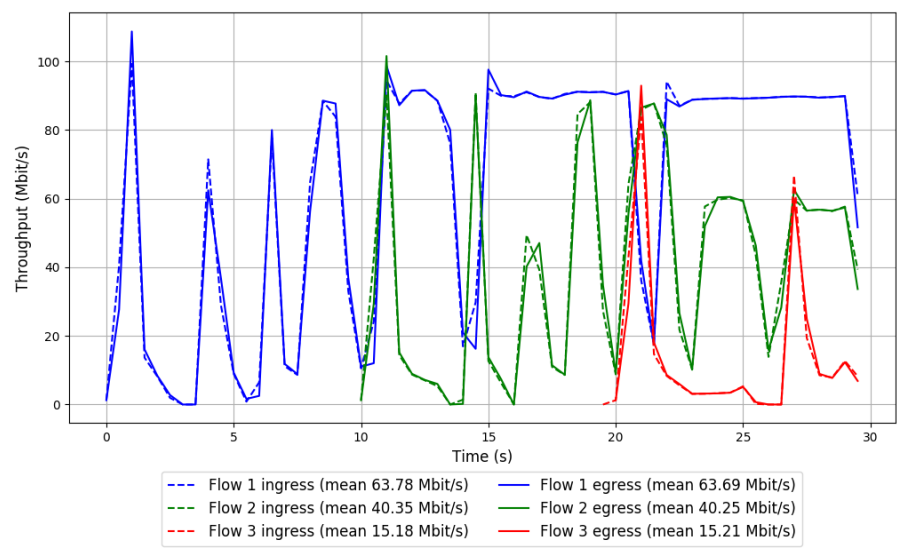
Run 4: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 45.51 Mbit/s)   Flow 1 egress (mean 45.45 Mbit/s)
Flow 2 ingress (mean 57.80 Mbit/s)   Flow 2 egress (mean 58.05 Mbit/s)
Flow 3 ingress (mean 67.62 Mbit/s)   Flow 3 egress (mean 68.19 Mbit/s)

Flow 1 (95th percentile 50.39 ms)   Flow 2 (95th percentile 50.69 ms)   Flow 3 (95th percentile 50.45 ms)

```
Run 5: Statistics of QUIC Cubic

Start at: 2017-09-18 23:13:06
End at: 2017-09-18 23:13:36


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 95.38 Mbit/s
95th percentile per-packet one-way delay: 50.726 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 63.69 Mbit/s
95th percentile per-packet one-way delay: 50.727 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 40.25 Mbit/s
95th percentile per-packet one-way delay: 50.725 ms
Loss rate: 0.73%
-- Flow 3:
Average throughput: 15.21 Mbit/s
95th percentile per-packet one-way delay: 50.716 ms
Loss rate: 0.86%
```
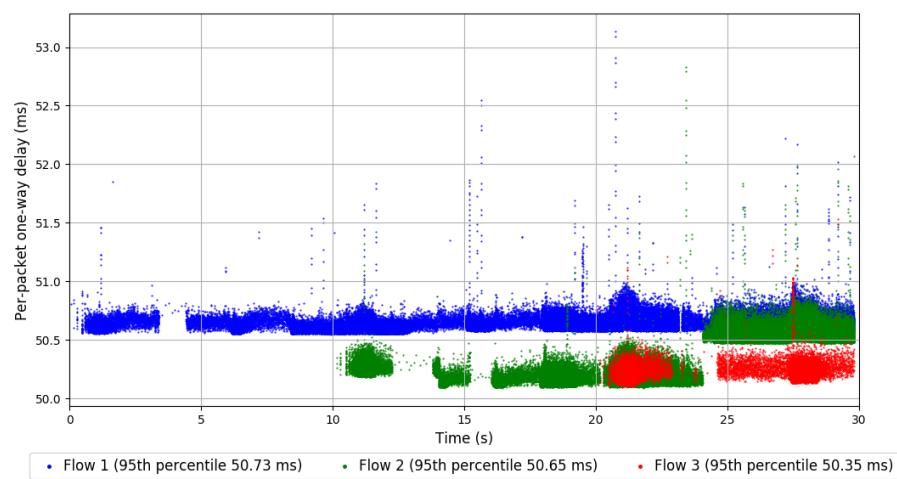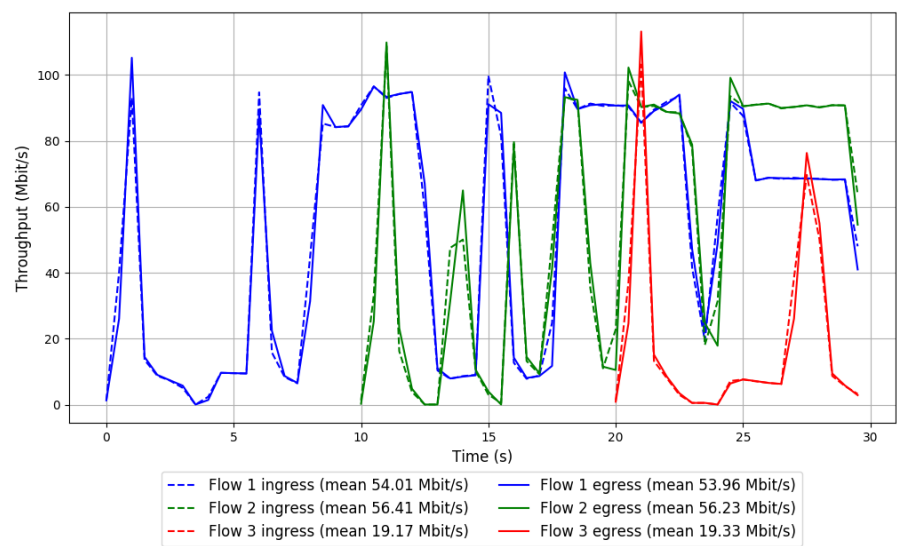
Run 5: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 63.78 Mbit/s)   Flow 1 egress (mean 63.69 Mbit/s)
Flow 2 ingress (mean 40.35 Mbit/s)   Flow 2 egress (mean 40.25 Mbit/s)
Flow 3 ingress (mean 15.18 Mbit/s)   Flow 3 egress (mean 15.21 Mbit/s)

Flow 1 (95th percentile 50.73 ms)   Flow 2 (95th percentile 50.73 ms)   Flow 3 (95th percentile 50.72 ms)

113

```
Run 6: Statistics of QUIC Cubic

Start at: 2017-09-18 23:22:18
End at: 2017-09-18 23:22:48


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 97.58 Mbit/s
95th percentile per-packet one-way delay: 50.714 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 53.96 Mbit/s
95th percentile per-packet one-way delay: 50.734 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 56.23 Mbit/s
95th percentile per-packet one-way delay: 50.649 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 19.33 Mbit/s
95th percentile per-packet one-way delay: 50.352 ms
Loss rate: 0.23%
```
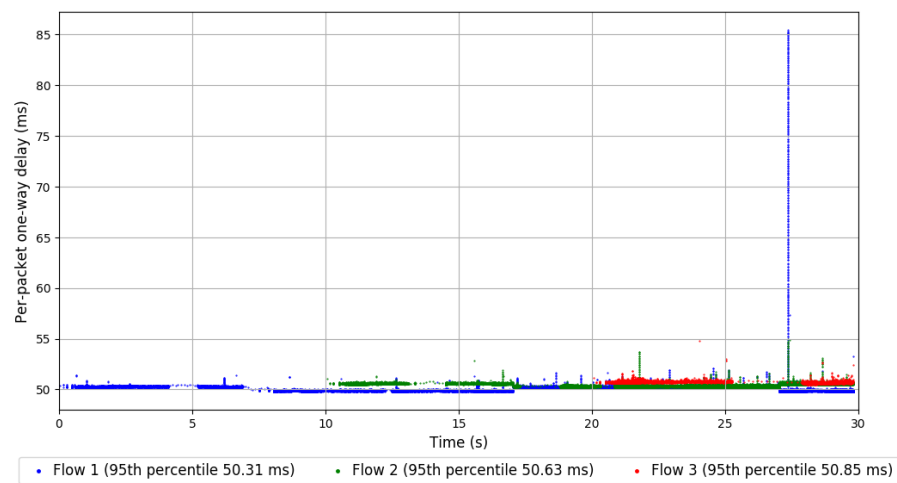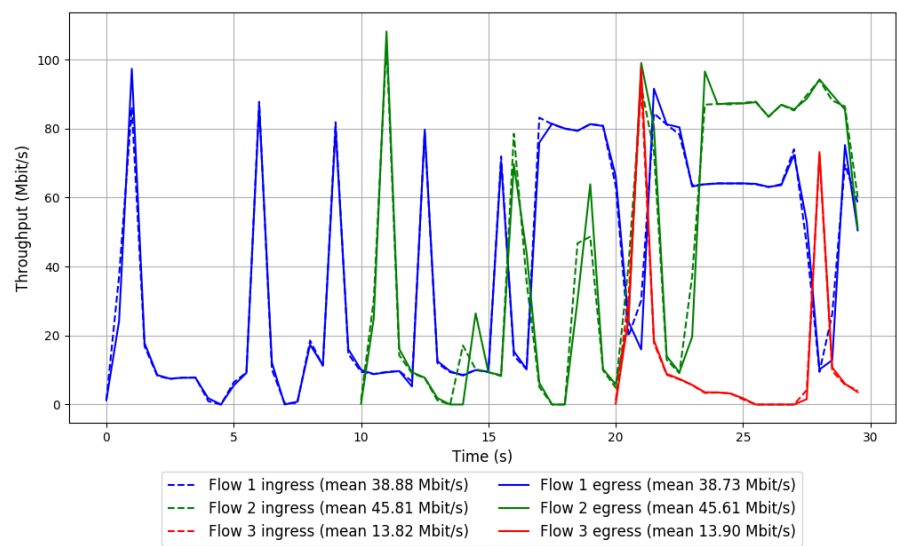
Run 6: Report of QUIC Cubic — Data Link

```
Run 7: Statistics of QUIC Cubic

Start at: 2017-09-18 23:31:35
End at: 2017-09-18 23:32:05


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 73.54 Mbit/s
95th percentile per-packet one-way delay: 50.652 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 38.73 Mbit/s
95th percentile per-packet one-way delay: 50.314 ms
Loss rate: 0.71%
-- Flow 2:
Average throughput: 45.61 Mbit/s
95th percentile per-packet one-way delay: 50.627 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 13.90 Mbit/s
95th percentile per-packet one-way delay: 50.848 ms
Loss rate: 0.39%
```
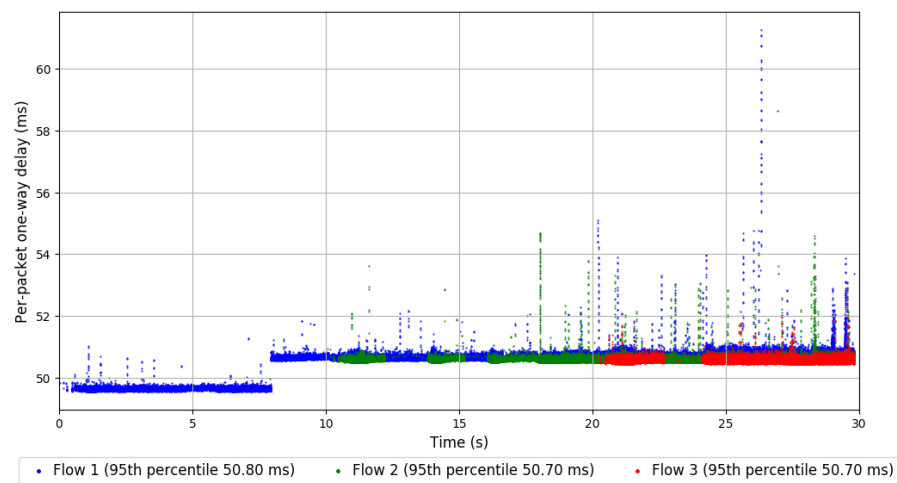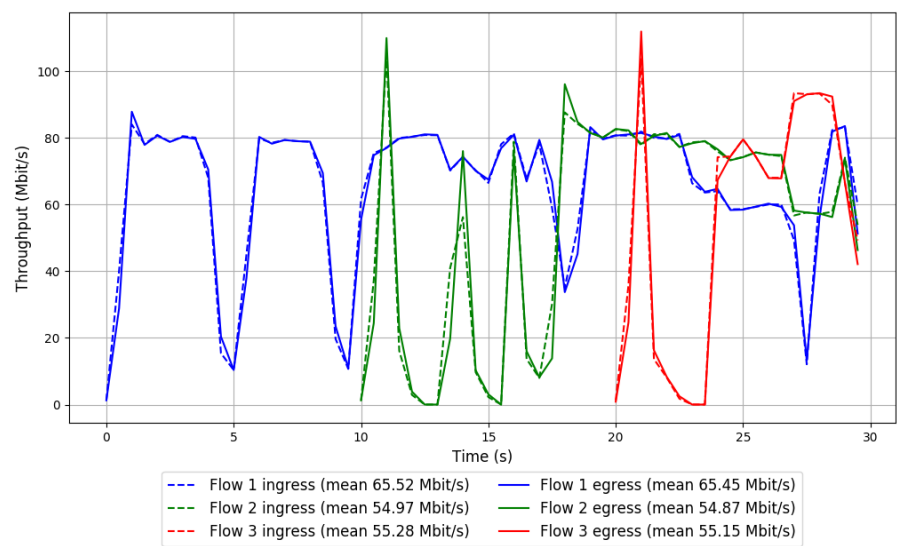
Run 7: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 38.88 Mbit/s) --- Flow 1 egress (mean 38.73 Mbit/s)
Flow 2 ingress (mean 45.81 Mbit/s) --- Flow 2 egress (mean 45.61 Mbit/s)
Flow 3 ingress (mean 13.82 Mbit/s) --- Flow 3 egress (mean 13.90 Mbit/s)

Flow 1 (95th percentile 50.31 ms)   Flow 2 (95th percentile 50.63 ms)   Flow 3 (95th percentile 50.85 ms)

```
Run 8: Statistics of QUIC Cubic

Start at: 2017-09-18 23:40:34
End at: 2017-09-18 23:41:04


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 119.91 Mbit/s
95th percentile per-packet one-way delay: 50.764 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 65.45 Mbit/s
95th percentile per-packet one-way delay: 50.801 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 54.87 Mbit/s
95th percentile per-packet one-way delay: 50.704 ms
Loss rate: 0.70%
-- Flow 3:
Average throughput: 55.15 Mbit/s
95th percentile per-packet one-way delay: 50.695 ms
Loss rate: 1.28%
```
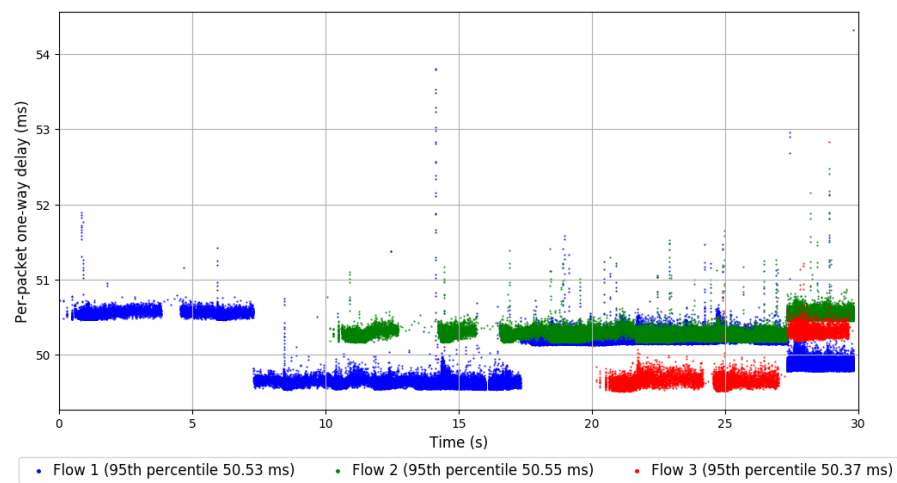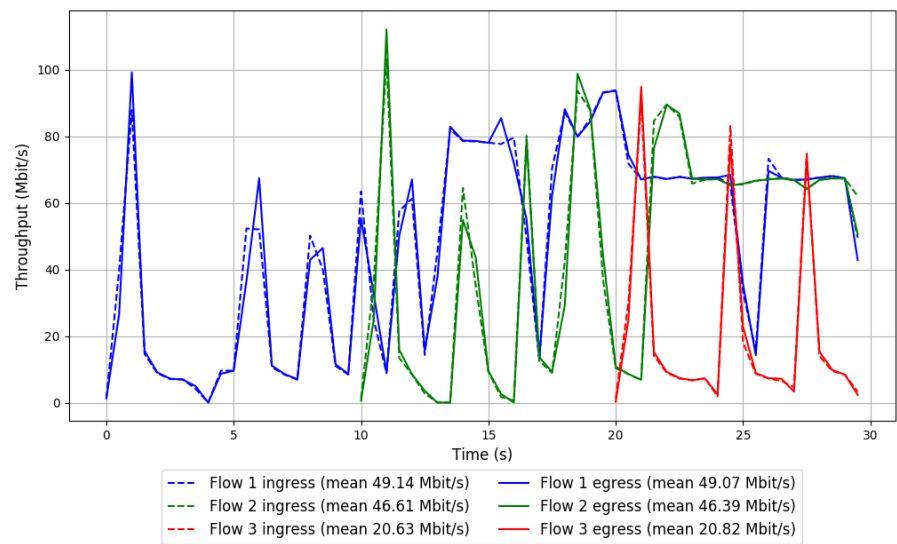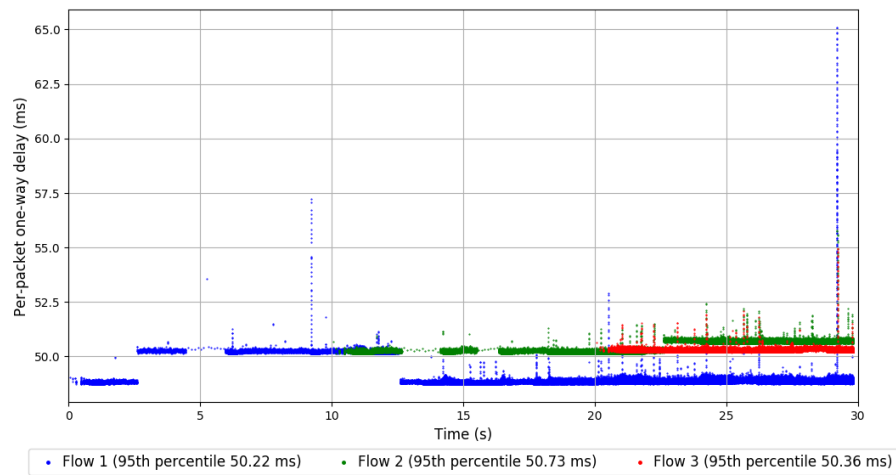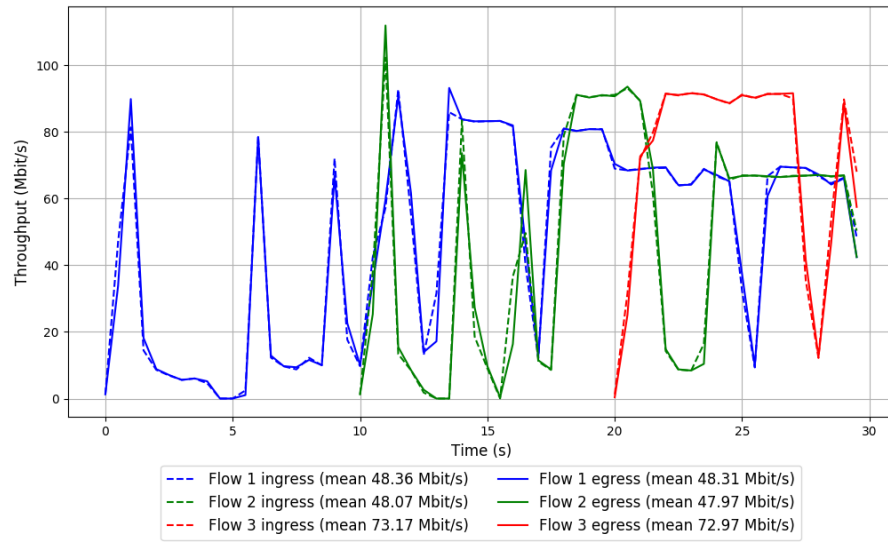
Run 8: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 65.52 Mbit/s) — Flow 1 egress (mean 65.45 Mbit/s)
Flow 2 ingress (mean 54.97 Mbit/s) — Flow 2 egress (mean 54.87 Mbit/s)
Flow 3 ingress (mean 55.28 Mbit/s) — Flow 3 egress (mean 55.15 Mbit/s)

Flow 1 (95th percentile 50.80 ms)   Flow 2 (95th percentile 50.70 ms)   Flow 3 (95th percentile 50.70 ms)

119

```
Run 9: Statistics of QUIC Cubic

Start at: 2017-09-18 23:50:05
End at: 2017-09-18 23:50:35


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 86.64 Mbit/s
95th percentile per-packet one-way delay: 50.535 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 49.07 Mbit/s
95th percentile per-packet one-way delay: 50.527 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 46.39 Mbit/s
95th percentile per-packet one-way delay: 50.555 ms
Loss rate: 0.99%
-- Flow 3:
Average throughput: 20.82 Mbit/s
95th percentile per-packet one-way delay: 50.366 ms
Loss rate: 0.43%
```
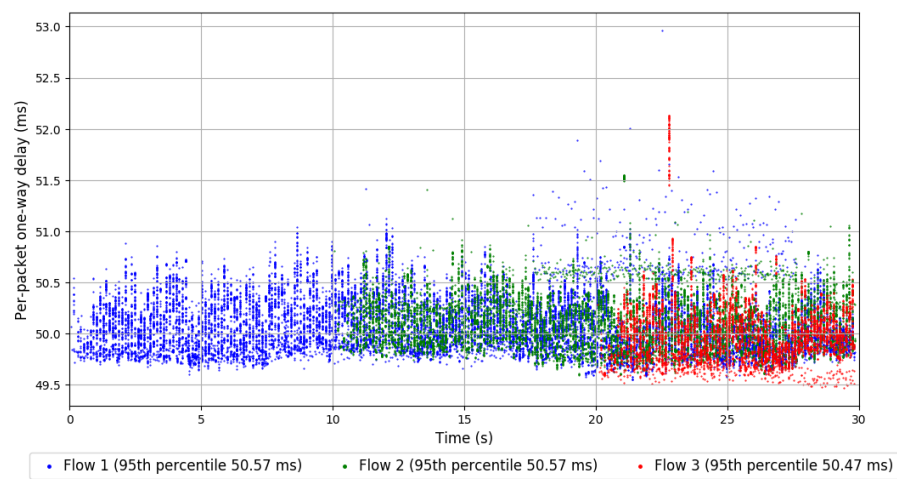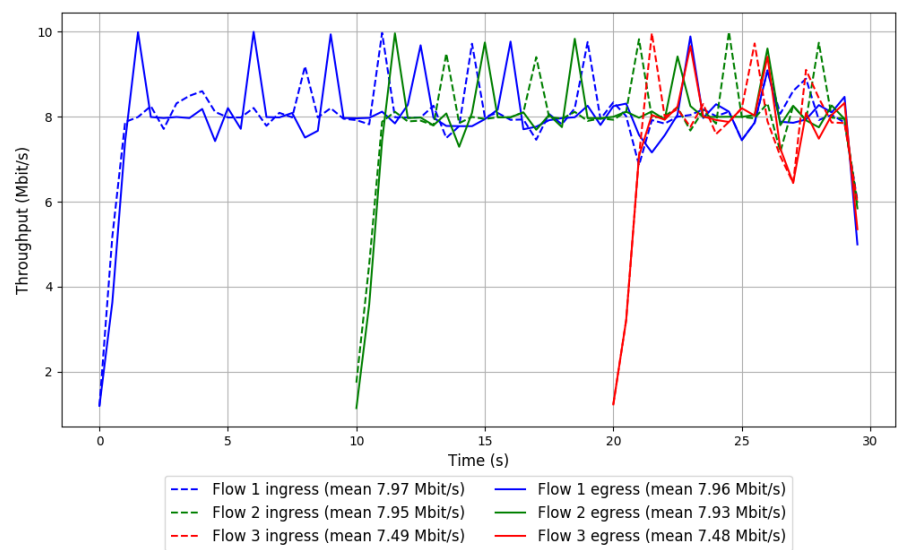
Run 9: Report of QUIC Cubic — Data Link

```
Run 10: Statistics of QUIC Cubic

Start at: 2017-09-18 23:59:09
End at: 2017-09-18 23:59:39


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 104.03 Mbit/s
95th percentile per-packet one-way delay: 50.682 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 48.31 Mbit/s
95th percentile per-packet one-way delay: 50.218 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 47.97 Mbit/s
95th percentile per-packet one-way delay: 50.733 ms
Loss rate: 0.76%
-- Flow 3:
Average throughput: 72.97 Mbit/s
95th percentile per-packet one-way delay: 50.357 ms
Loss rate: 1.37%
```

Run 10: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of Sprout

Start at: 2017-09-18 22:34:24
End at: 2017-09-18 22:34:54


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.66 Mbit/s
95th percentile per-packet one-way delay: 50.563 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 7.96 Mbit/s
95th percentile per-packet one-way delay: 50.571 ms
Loss rate: 0.41%
-- Flow 2:
Average throughput: 7.93 Mbit/s
95th percentile per-packet one-way delay: 50.571 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 7.48 Mbit/s
95th percentile per-packet one-way delay: 50.469 ms
Loss rate: 1.32%
```
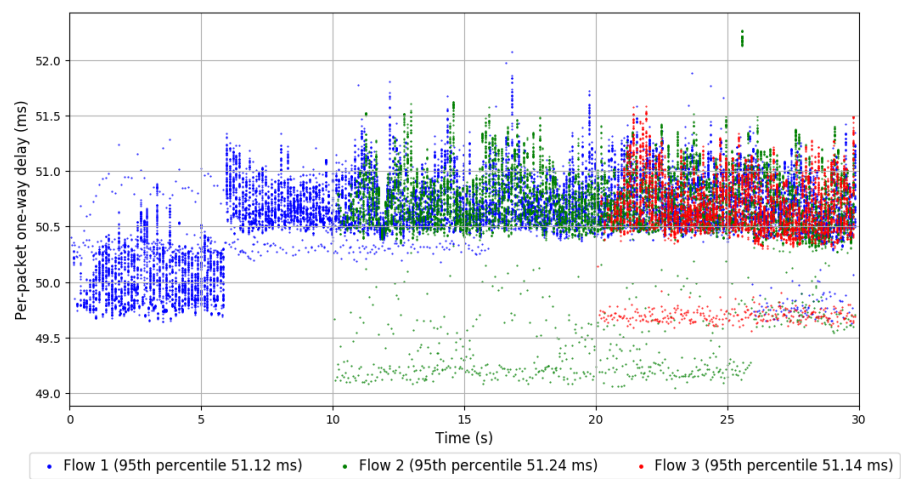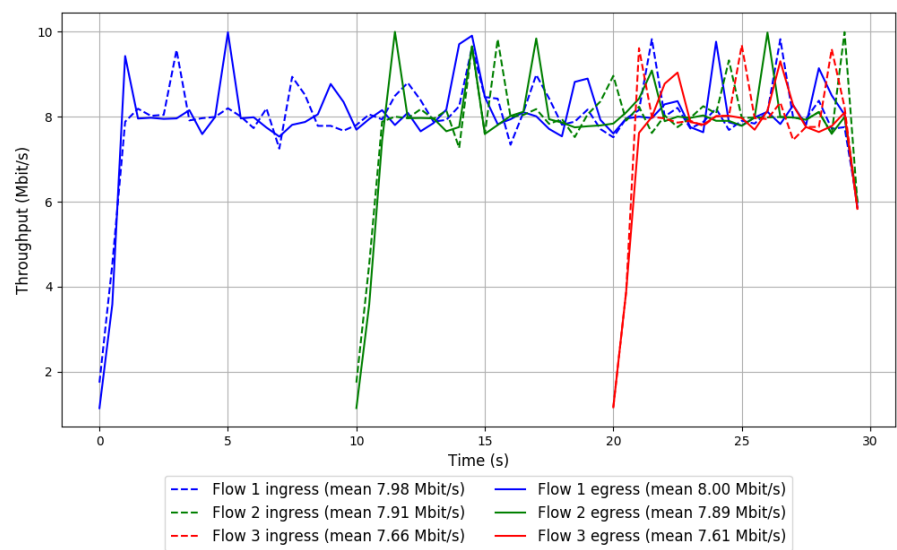
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-09-18 22:43:36
End at: 2017-09-18 22:44:06

# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.73 Mbit/s
95th percentile per-packet one-way delay: 51.160 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 8.00 Mbit/s
95th percentile per-packet one-way delay: 51.123 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 7.89 Mbit/s
95th percentile per-packet one-way delay: 51.236 ms
Loss rate: 0.69%
-- Flow 3:
Average throughput: 7.61 Mbit/s
95th percentile per-packet one-way delay: 51.141 ms
Loss rate: 1.37%
```
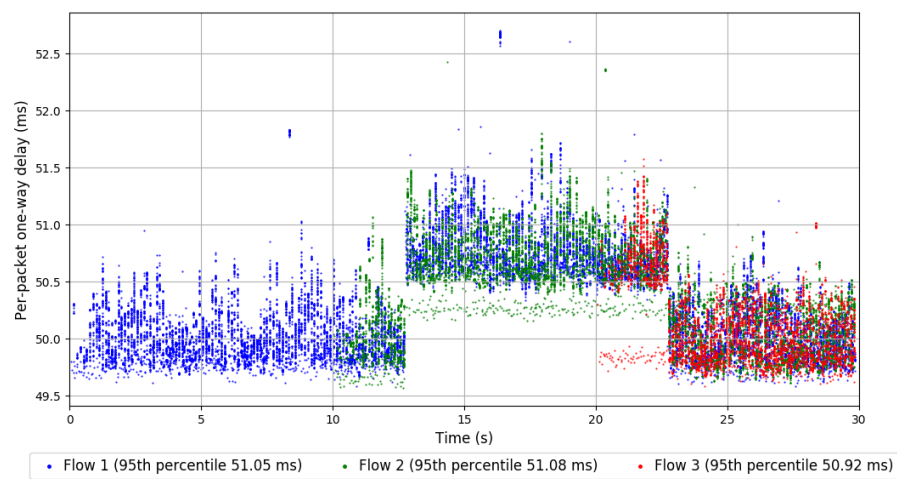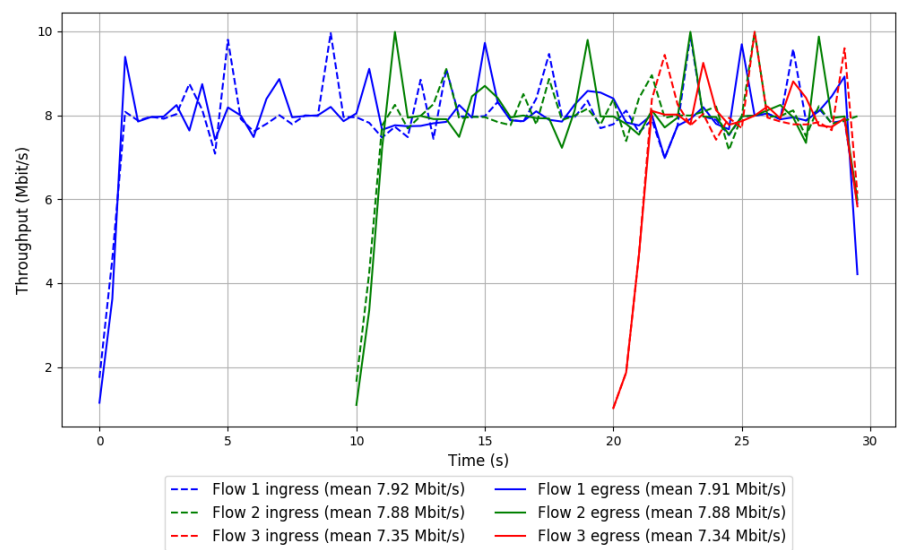
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2017-09-18 22:52:49
End at: 2017-09-18 22:53:19


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.53 Mbit/s
95th percentile per-packet one-way delay: 51.047 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 7.91 Mbit/s
95th percentile per-packet one-way delay: 51.051 ms
Loss rate: 0.40%
-- Flow 2:
Average throughput: 7.88 Mbit/s
95th percentile per-packet one-way delay: 51.075 ms
Loss rate: 0.64%
-- Flow 3:
Average throughput: 7.34 Mbit/s
95th percentile per-packet one-way delay: 50.925 ms
Loss rate: 1.36%
```
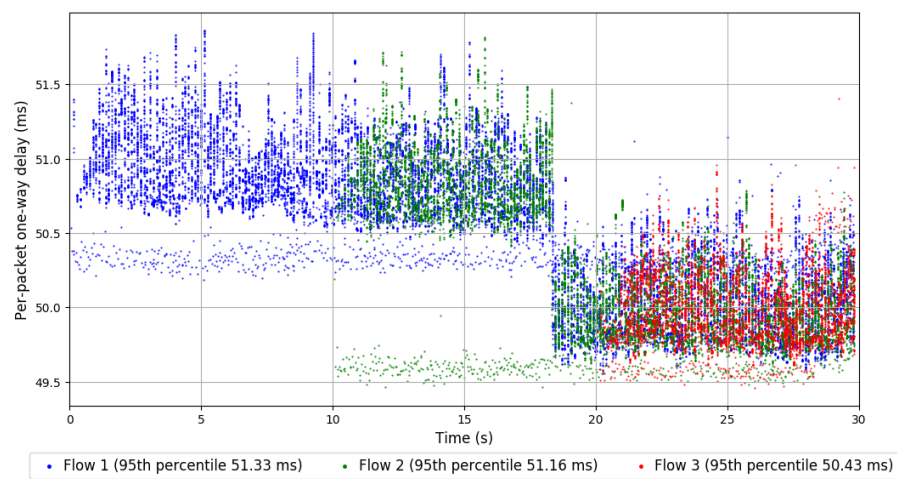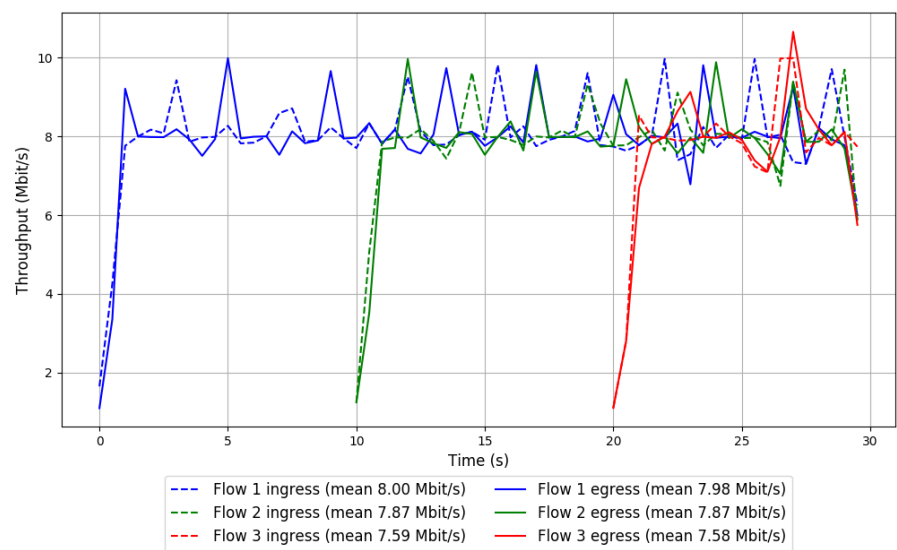
Run 3: Report of Sprout — Data Link

```
Run 4: Statistics of Sprout

Start at: 2017-09-18 23:01:54
End at: 2017-09-18 23:02:24


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.68 Mbit/s
95th percentile per-packet one-way delay: 51.246 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 7.98 Mbit/s
95th percentile per-packet one-way delay: 51.328 ms
Loss rate: 0.51%
-- Flow 2:
Average throughput: 7.87 Mbit/s
95th percentile per-packet one-way delay: 51.156 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 7.58 Mbit/s
95th percentile per-packet one-way delay: 50.432 ms
Loss rate: 1.33%
```

Run 4: Report of Sprout — Data Link

```
Run 5: Statistics of Sprout

Start at: 2017-09-18 23:11:20
End at: 2017-09-18 23:11:50


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.61 Mbit/s
95th percentile per-packet one-way delay: 51.191 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 7.92 Mbit/s
95th percentile per-packet one-way delay: 51.312 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 7.81 Mbit/s
95th percentile per-packet one-way delay: 50.963 ms
Loss rate: 0.64%
-- Flow 3:
Average throughput: 7.68 Mbit/s
95th percentile per-packet one-way delay: 50.562 ms
Loss rate: 0.46%
```
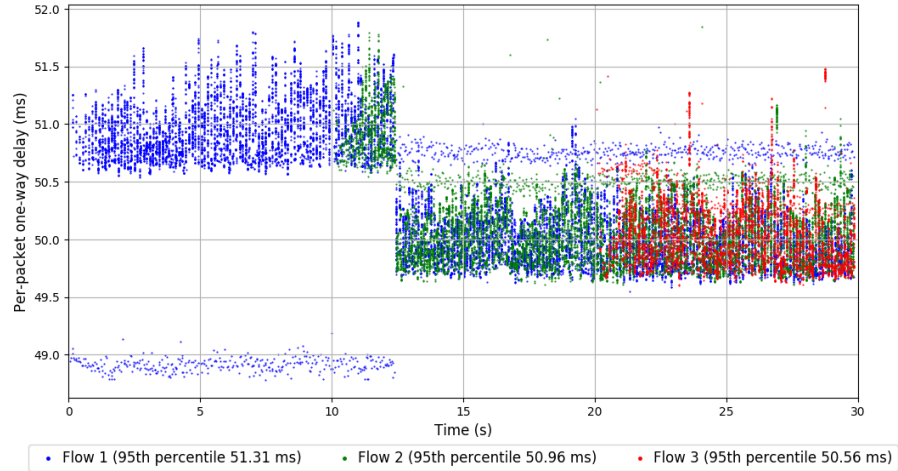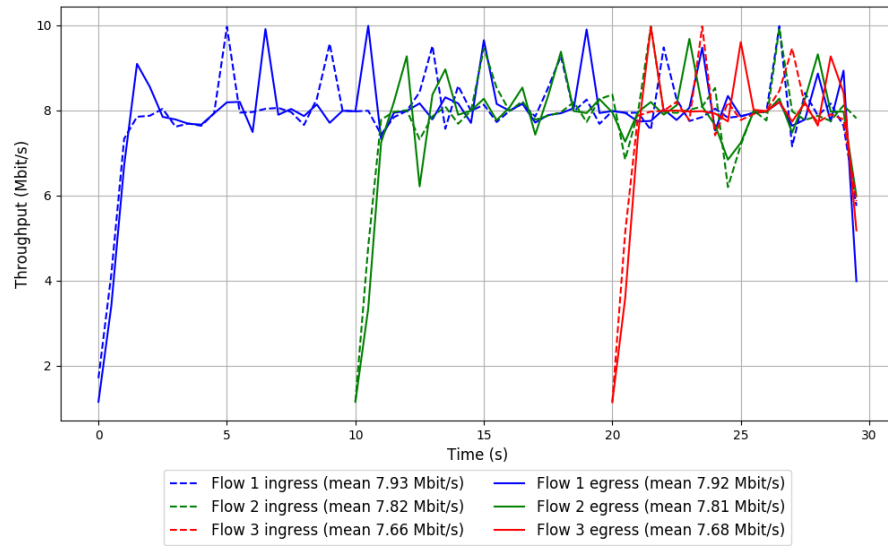
Run 5: Report of Sprout — Data Link

133

```
Run 6: Statistics of Sprout

Start at: 2017-09-18 23:20:32
End at: 2017-09-18 23:21:02


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.70 Mbit/s
95th percentile per-packet one-way delay: 51.169 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 7.96 Mbit/s
95th percentile per-packet one-way delay: 51.197 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 7.87 Mbit/s
95th percentile per-packet one-way delay: 51.200 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 7.68 Mbit/s
95th percentile per-packet one-way delay: 50.494 ms
Loss rate: 1.19%
```
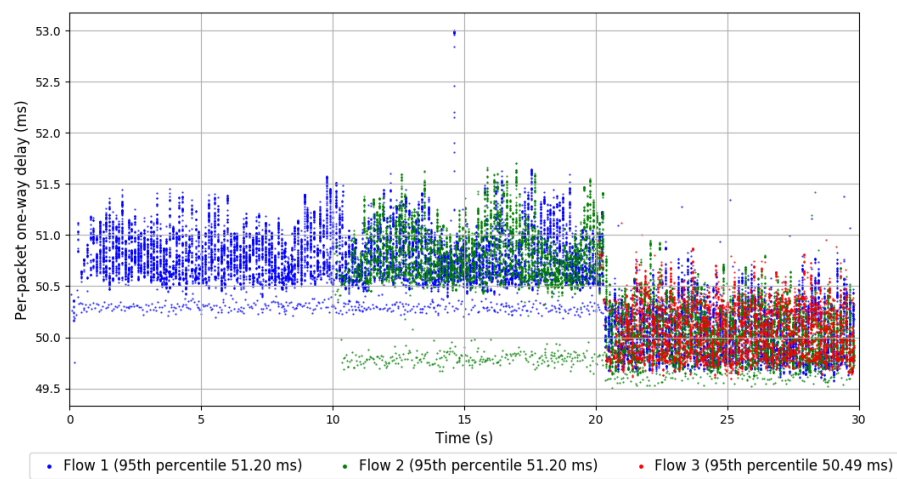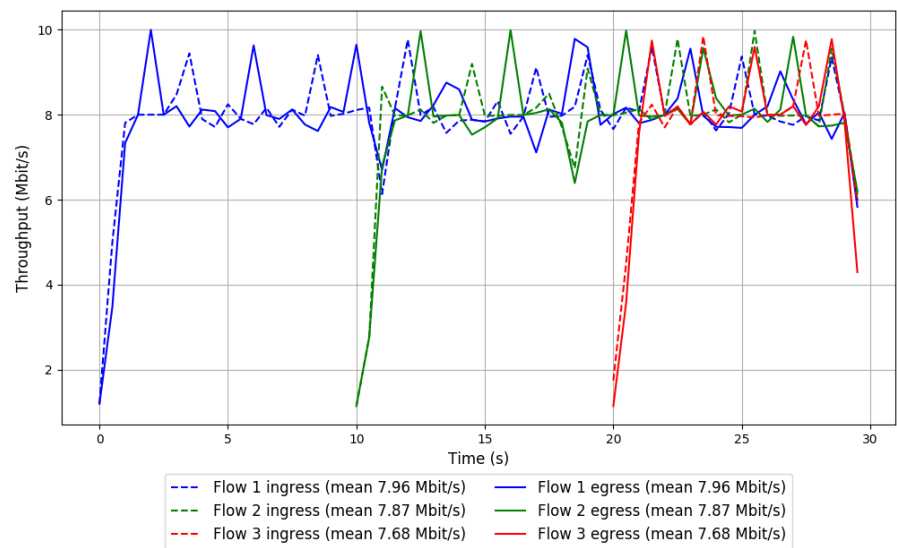
Run 6: Report of Sprout — Data Link

```
Run 7: Statistics of Sprout

Start at: 2017-09-18 23:29:49
End at: 2017-09-18 23:30:19


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.71 Mbit/s
95th percentile per-packet one-way delay: 51.130 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 51.112 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 7.89 Mbit/s
95th percentile per-packet one-way delay: 51.113 ms
Loss rate: 0.78%
-- Flow 3:
Average throughput: 7.61 Mbit/s
95th percentile per-packet one-way delay: 51.243 ms
Loss rate: 1.33%
```
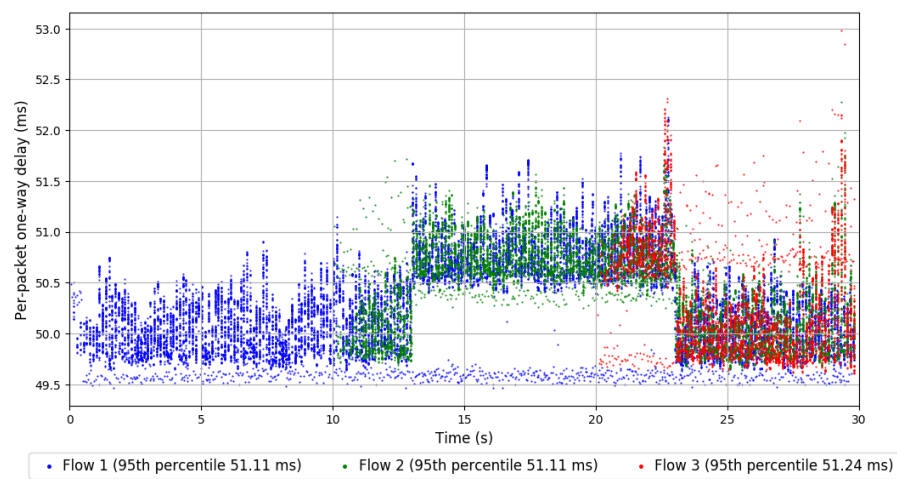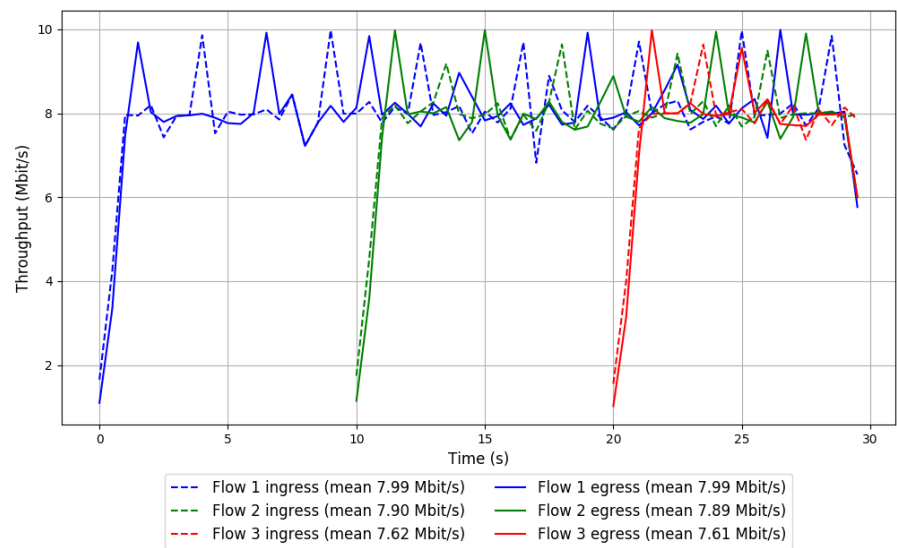
Run 7: Report of Sprout — Data Link

137

```
Run 8: Statistics of Sprout

Start at: 2017-09-18 23:38:56
End at: 2017-09-18 23:39:26


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.73 Mbit/s
95th percentile per-packet one-way delay: 51.059 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 8.03 Mbit/s
95th percentile per-packet one-way delay: 51.055 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 7.85 Mbit/s
95th percentile per-packet one-way delay: 51.068 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 7.60 Mbit/s
95th percentile per-packet one-way delay: 51.055 ms
Loss rate: 1.13%
```
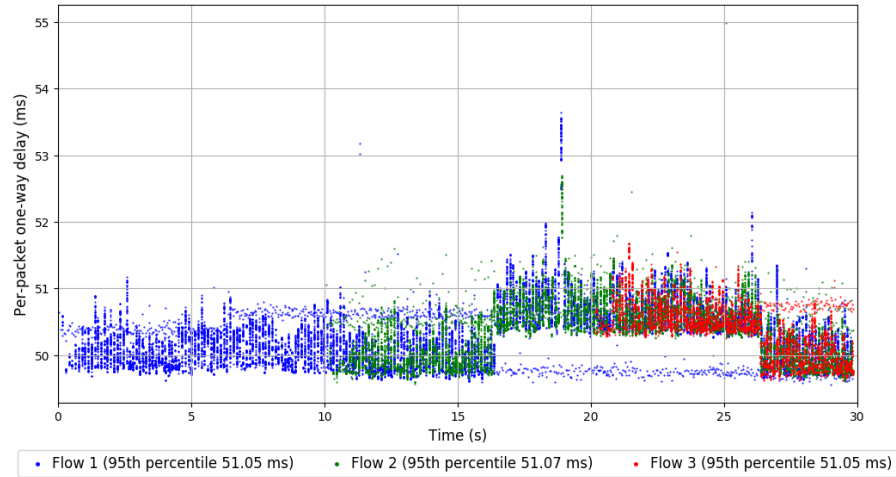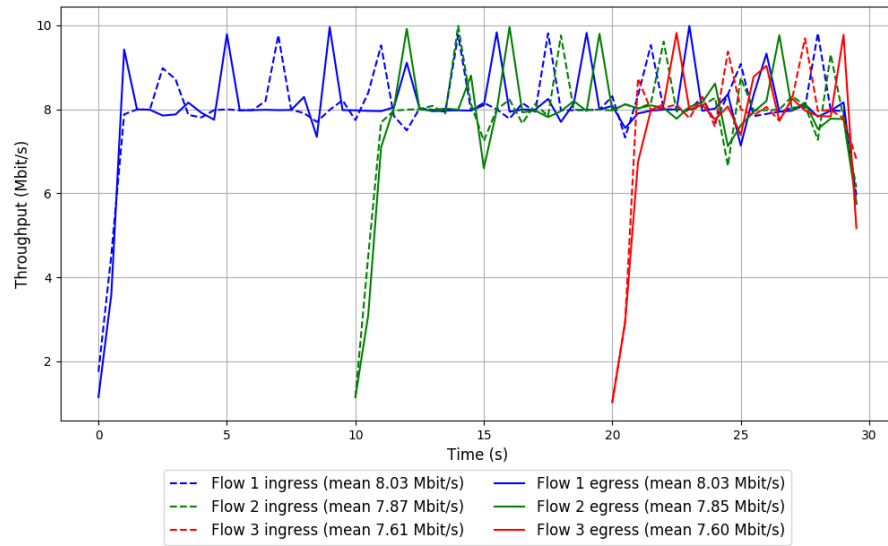
Run 8: Report of Sprout — Data Link

139

```
Run 9: Statistics of Sprout

Start at: 2017-09-18 23:48:19
End at: 2017-09-18 23:48:49


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.81 Mbit/s
95th percentile per-packet one-way delay: 50.934 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 8.00 Mbit/s
95th percentile per-packet one-way delay: 50.882 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 7.98 Mbit/s
95th percentile per-packet one-way delay: 50.989 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 7.66 Mbit/s
95th percentile per-packet one-way delay: 51.056 ms
Loss rate: 0.28%
```
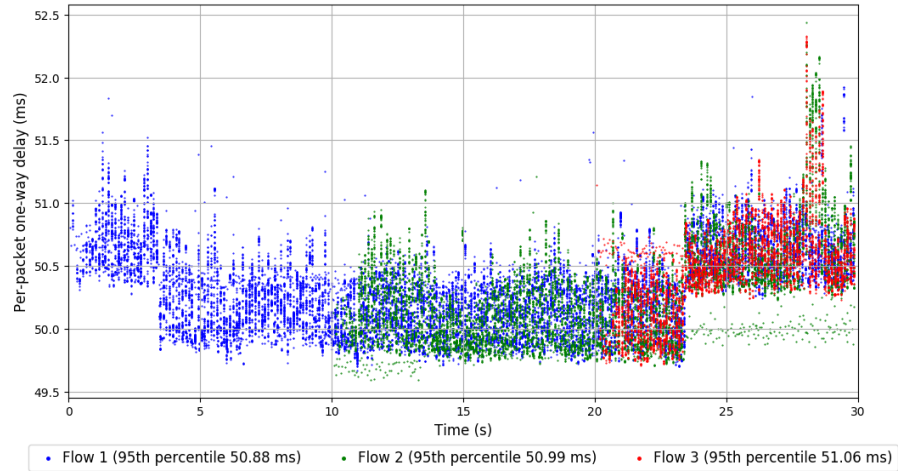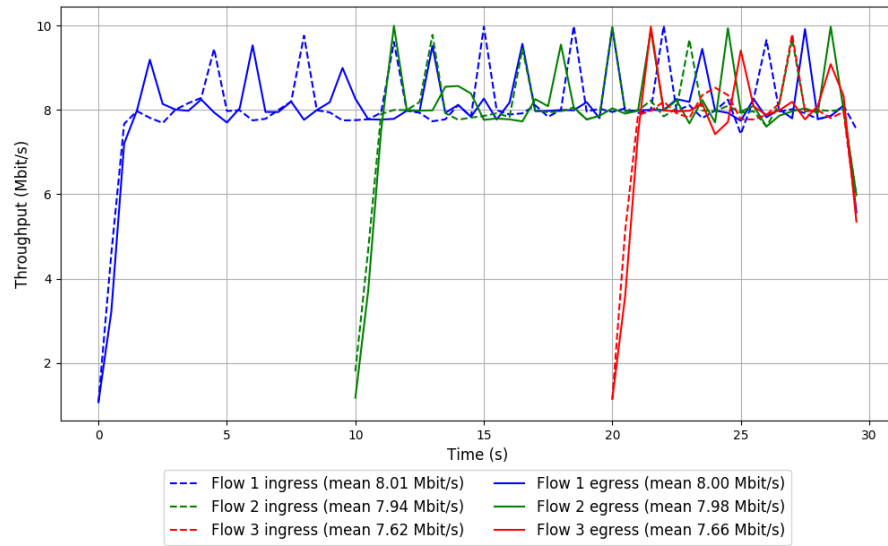
Run 9: Report of Sprout — Data Link

Flow 1 ingress (mean 8.01 Mbit/s)   Flow 1 egress (mean 8.00 Mbit/s)
Flow 2 ingress (mean 7.94 Mbit/s)   Flow 2 egress (mean 7.98 Mbit/s)
Flow 3 ingress (mean 7.62 Mbit/s)   Flow 3 egress (mean 7.66 Mbit/s)

Flow 1 (95th percentile 50.88 ms)   Flow 2 (95th percentile 50.99 ms)   Flow 3 (95th percentile 51.06 ms)

141

```
Run 10: Statistics of Sprout

Start at: 2017-09-18 23:57:23
End at: 2017-09-18 23:57:53


# Below is generated by plot.py at 2017-09-19 02:34:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 15.71 Mbit/s
95th percentile per-packet one-way delay: 51.142 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 7.91 Mbit/s
95th percentile per-packet one-way delay: 51.301 ms
Loss rate: 0.55%
-- Flow 2:
Average throughput: 7.91 Mbit/s
95th percentile per-packet one-way delay: 50.628 ms
Loss rate: 0.59%
-- Flow 3:
Average throughput: 7.79 Mbit/s
95th percentile per-packet one-way delay: 50.650 ms
Loss rate: 1.26%
```
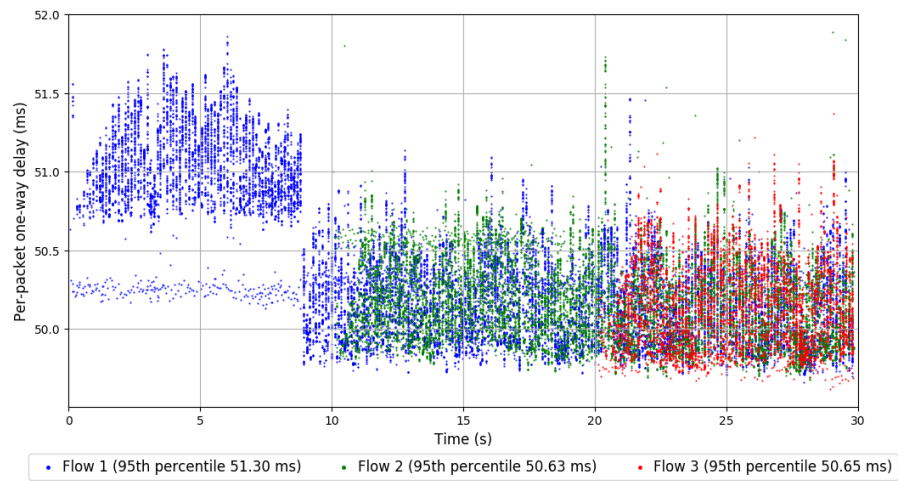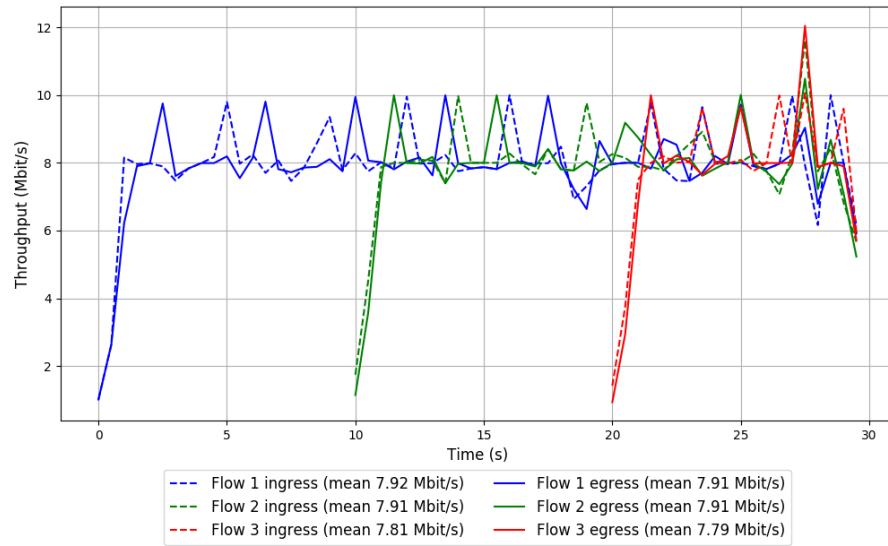
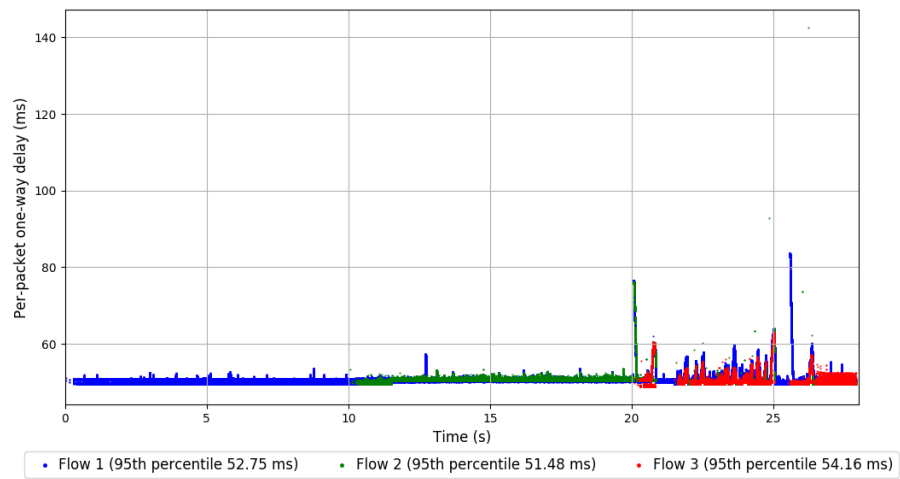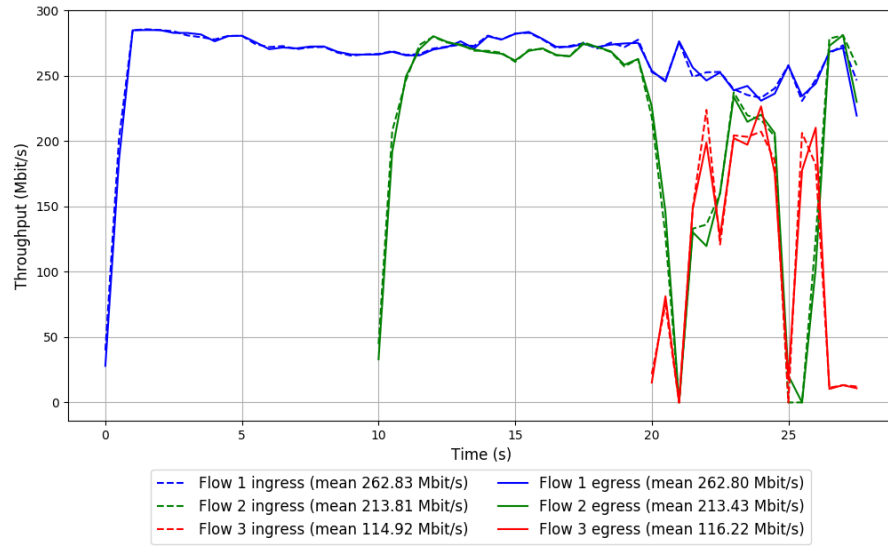# Run 10: Report of Sprout — Data Link

143

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

Start at: 2017-09-18 22:32:19
End at: 2017-09-18 22:32:49


# Below is generated by plot.py at 2017-09-19 02:42:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 432.06 Mbit/s
95th percentile per-packet one-way delay: 52.508 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 262.80 Mbit/s
95th percentile per-packet one-way delay: 52.753 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 213.43 Mbit/s
95th percentile per-packet one-way delay: 51.476 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 116.22 Mbit/s
95th percentile per-packet one-way delay: 54.156 ms
Loss rate: 0.15%
```

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

Flow 1 ingress (mean 262.83 Mbit/s) --- Flow 1 egress (mean 262.80 Mbit/s)
Flow 2 ingress (mean 213.81 Mbit/s) --- Flow 2 egress (mean 213.43 Mbit/s)
Flow 3 ingress (mean 114.92 Mbit/s) --- Flow 3 egress (mean 116.22 Mbit/s)

Flow 1 (95th percentile 52.75 ms)   Flow 2 (95th percentile 51.48 ms)   Flow 3 (95th percentile 54.16 ms)
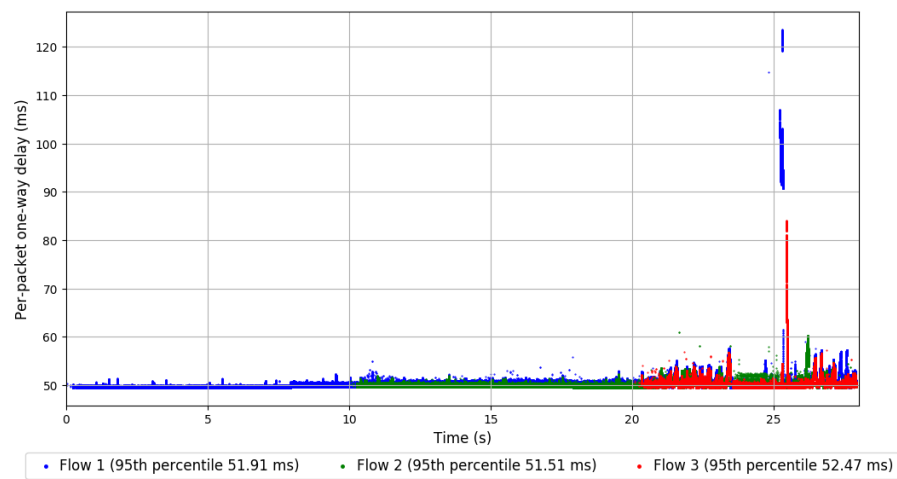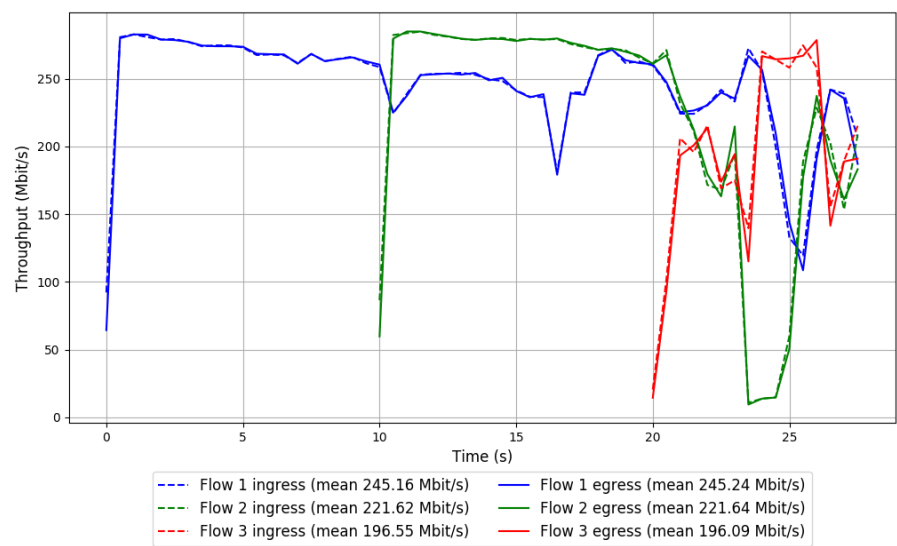
```
Run 2: Statistics of TaoVA-100x

Start at: 2017-09-18 22:41:32
End at: 2017-09-18 22:42:02

# Below is generated by plot.py at 2017-09-19 02:42:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 442.19 Mbit/s
95th percentile per-packet one-way delay: 51.860 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 245.24 Mbit/s
95th percentile per-packet one-way delay: 51.911 ms
Loss rate: 0.33%
-- Flow 2:
Average throughput: 221.64 Mbit/s
95th percentile per-packet one-way delay: 51.513 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 196.09 Mbit/s
95th percentile per-packet one-way delay: 52.465 ms
Loss rate: 1.51%
```

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

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

Start at: 2017-09-18 22:50:43
End at: 2017-09-18 22:51:13


# Below is generated by plot.py at 2017-09-19 02:42:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 446.95 Mbit/s
95th percentile per-packet one-way delay: 54.288 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 265.74 Mbit/s
95th percentile per-packet one-way delay: 53.293 ms
Loss rate: 0.31%
-- Flow 2:
Average throughput: 189.14 Mbit/s
95th percentile per-packet one-way delay: 50.930 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 214.52 Mbit/s
95th percentile per-packet one-way delay: 63.563 ms
Loss rate: 1.02%
```
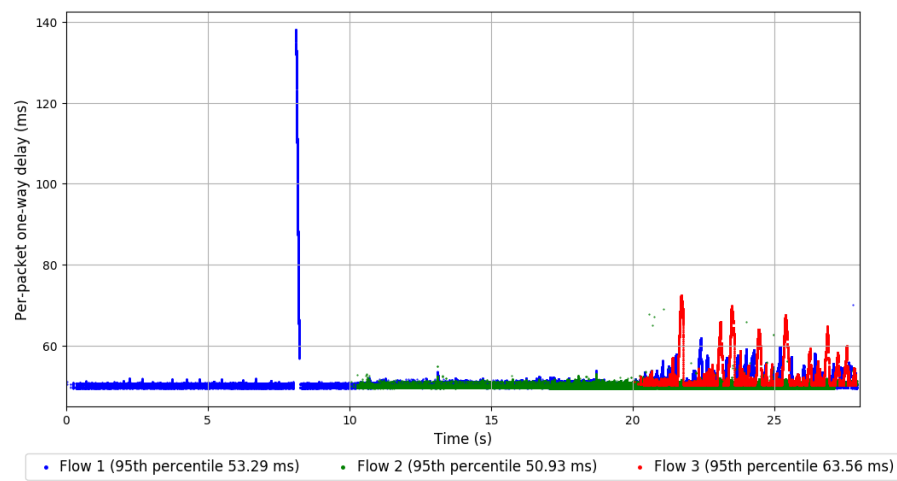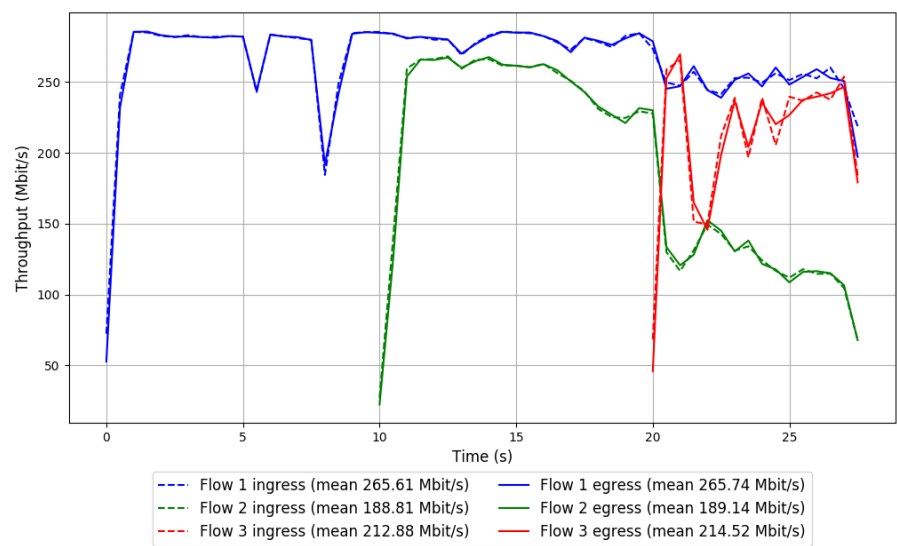
Run 3: Report of TaoVA-100x — Data Link

- - - - Flow 1 ingress (mean 265.61 Mbit/s)   —— Flow 1 egress (mean 265.74 Mbit/s)
- - - - Flow 2 ingress (mean 188.81 Mbit/s)   —— Flow 2 egress (mean 189.14 Mbit/s)
- - - - Flow 3 ingress (mean 212.88 Mbit/s)   —— Flow 3 egress (mean 214.52 Mbit/s)

- Flow 1 (95th percentile 53.29 ms)   - Flow 2 (95th percentile 50.93 ms)   - Flow 3 (95th percentile 63.56 ms)
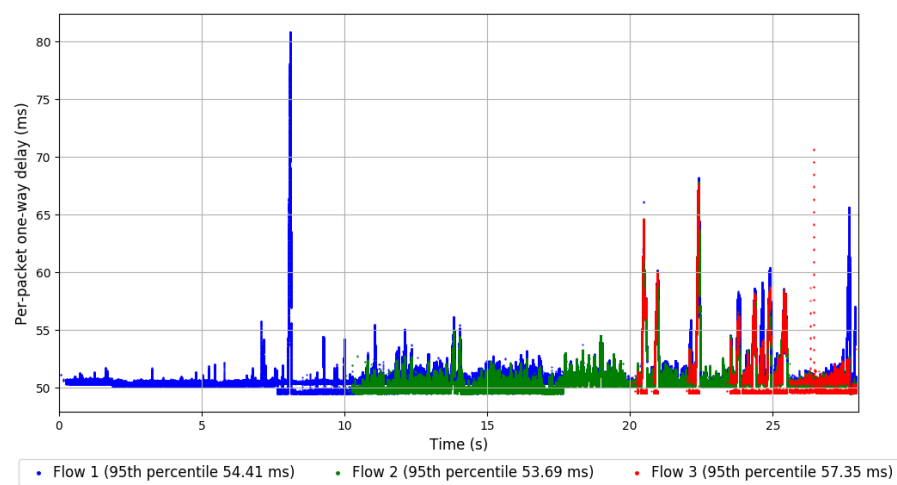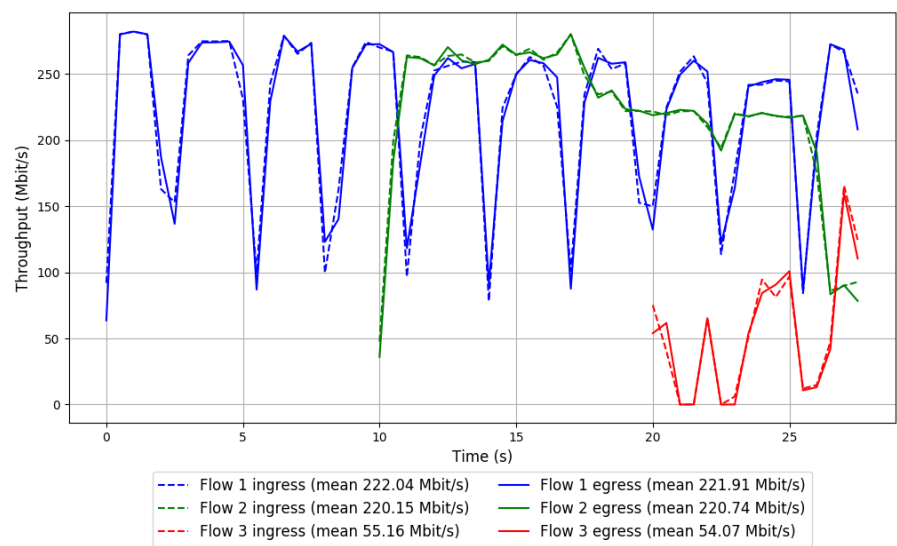
149

```
Run 4: Statistics of TaoVA-100x

Start at: 2017-09-18 22:59:52
End at: 2017-09-18 23:00:22

# Below is generated by plot.py at 2017-09-19 02:42:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 378.51 Mbit/s
95th percentile per-packet one-way delay: 54.462 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 221.91 Mbit/s
95th percentile per-packet one-way delay: 54.410 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 220.74 Mbit/s
95th percentile per-packet one-way delay: 53.689 ms
Loss rate: 0.30%
-- Flow 3:
Average throughput: 54.07 Mbit/s
95th percentile per-packet one-way delay: 57.355 ms
Loss rate: 3.19%
```

Run 4: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 222.04 Mbit/s) --- Flow 1 egress (mean 221.91 Mbit/s)
Flow 2 ingress (mean 220.15 Mbit/s) --- Flow 2 egress (mean 220.74 Mbit/s)
Flow 3 ingress (mean 55.16 Mbit/s) --- Flow 3 egress (mean 54.07 Mbit/s)

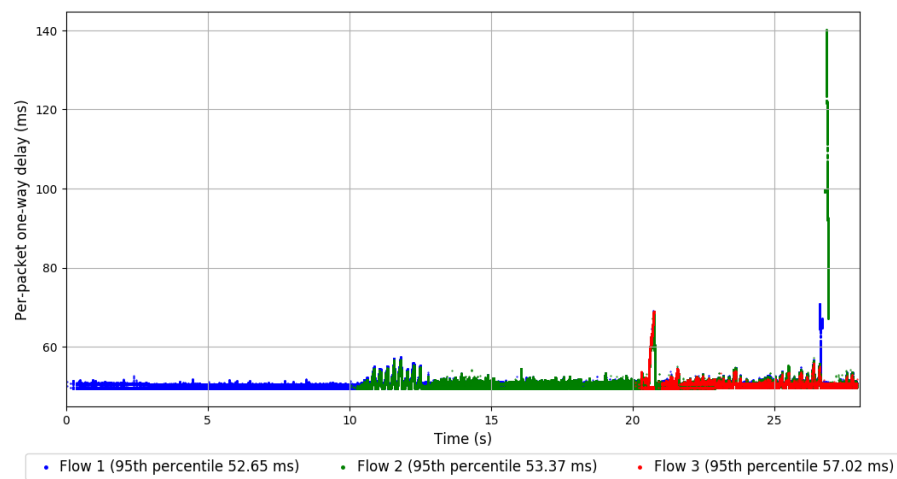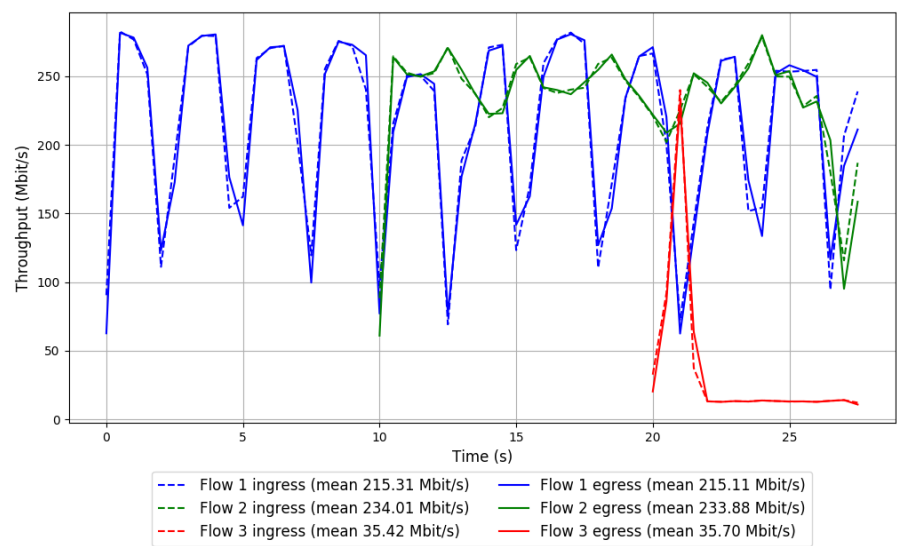Flow 1 (95th percentile 54.41 ms)   Flow 2 (95th percentile 53.69 ms)   Flow 3 (95th percentile 57.35 ms)

```
Run 5: Statistics of TaoVA-100x

Start at: 2017-09-18 23:09:17
End at: 2017-09-18 23:09:47

# Below is generated by plot.py at 2017-09-19 02:42:45
# Datalink statistics
-- Total of 3 flows:
Average throughput: 374.94 Mbit/s
95th percentile per-packet one-way delay: 53.020 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 215.11 Mbit/s
95th percentile per-packet one-way delay: 52.653 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 233.88 Mbit/s
95th percentile per-packet one-way delay: 53.366 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 35.70 Mbit/s
95th percentile per-packet one-way delay: 57.019 ms
Loss rate: 0.49%
```

Run 5: Report of TaoVA-100x — Data Link

```
Run 6: Statistics of TaoVA-100x

Start at: 2017-09-18 23:18:26
End at: 2017-09-18 23:18:56

# Below is generated by plot.py at 2017-09-19 02:42:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 438.36 Mbit/s
95th percentile per-packet one-way delay: 51.729 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 265.87 Mbit/s
95th percentile per-packet one-way delay: 51.529 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 182.98 Mbit/s
95th percentile per-packet one-way delay: 50.726 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 197.31 Mbit/s
95th percentile per-packet one-way delay: 54.642 ms
Loss rate: 1.75%
```
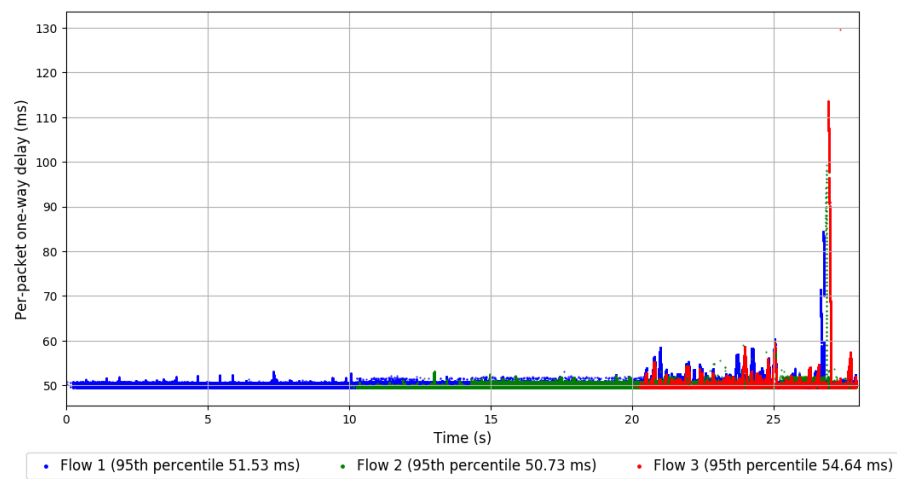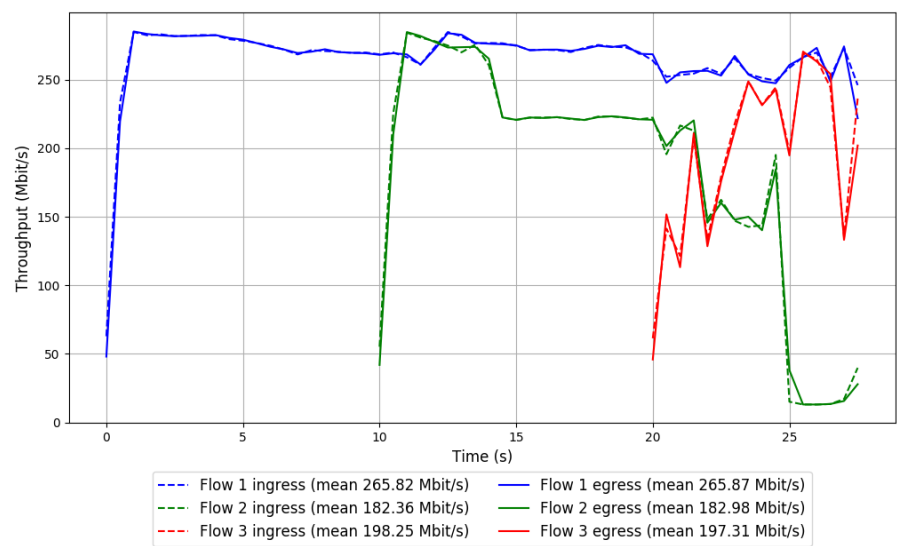
Run 6: Report of TaoVA-100x — Data Link

- - - - Flow 1 ingress (mean 265.82 Mbit/s)   —— Flow 1 egress (mean 265.87 Mbit/s)
- - - - Flow 2 ingress (mean 182.36 Mbit/s)   —— Flow 2 egress (mean 182.98 Mbit/s)
- - - - Flow 3 ingress (mean 198.25 Mbit/s)   —— Flow 3 egress (mean 197.31 Mbit/s)

- Flow 1 (95th percentile 51.53 ms)   • Flow 2 (95th percentile 50.73 ms)   • Flow 3 (95th percentile 54.64 ms)

155

```
Run 7: Statistics of TaoVA-100x

Start at: 2017-09-18 23:27:38
End at: 2017-09-18 23:28:08

# Below is generated by plot.py at 2017-09-19 02:48:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 465.33 Mbit/s
95th percentile per-packet one-way delay: 52.776 ms
Loss rate: 0.62%
-- Flow 1:
Average throughput: 268.27 Mbit/s
95th percentile per-packet one-way delay: 50.912 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 224.58 Mbit/s
95th percentile per-packet one-way delay: 54.093 ms
Loss rate: 0.66%
-- Flow 3:
Average throughput: 189.69 Mbit/s
95th percentile per-packet one-way delay: 66.625 ms
Loss rate: 1.69%
```
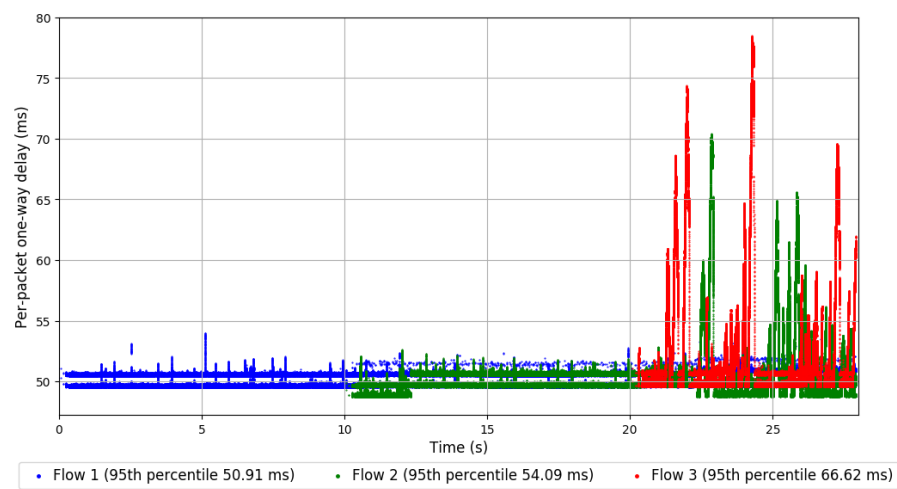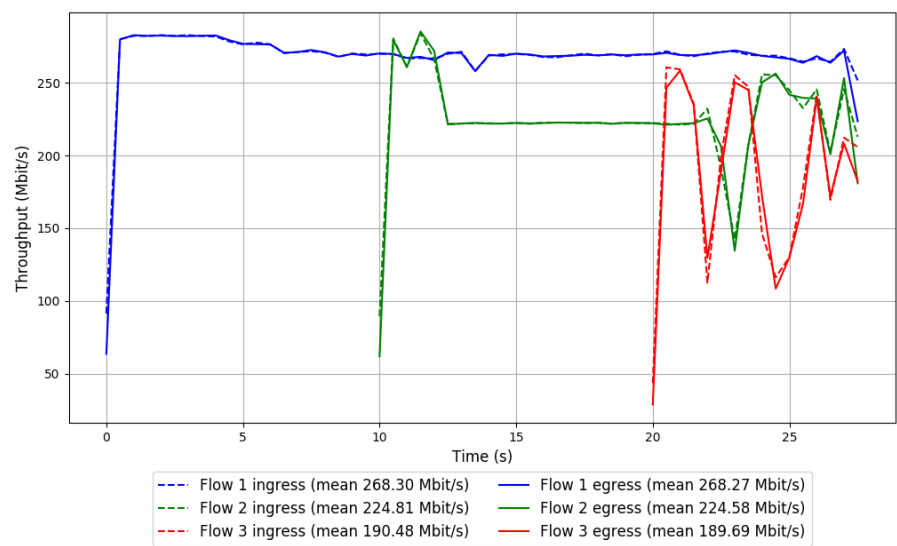
Run 7: Report of TaoVA-100x — Data Link

- Flow 1 ingress (mean 268.30 Mbit/s)
- Flow 1 egress (mean 268.27 Mbit/s)
- Flow 2 ingress (mean 224.81 Mbit/s)
- Flow 2 egress (mean 224.58 Mbit/s)
- Flow 3 ingress (mean 190.48 Mbit/s)
- Flow 3 egress (mean 189.69 Mbit/s)

- Flow 1 (95th percentile 50.91 ms)
- Flow 2 (95th percentile 54.09 ms)
- Flow 3 (95th percentile 66.62 ms)

157

```
Run 8: Statistics of TaoVA-100x

Start at: 2017-09-18 23:36:54
End at: 2017-09-18 23:37:24


# Below is generated by plot.py at 2017-09-19 02:48:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 392.11 Mbit/s
95th percentile per-packet one-way delay: 51.226 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 209.87 Mbit/s
95th percentile per-packet one-way delay: 50.796 ms
Loss rate: 0.40%
-- Flow 2:
Average throughput: 198.62 Mbit/s
95th percentile per-packet one-way delay: 53.359 ms
Loss rate: 0.74%
-- Flow 3:
Average throughput: 196.32 Mbit/s
95th percentile per-packet one-way delay: 50.882 ms
Loss rate: 1.34%
```
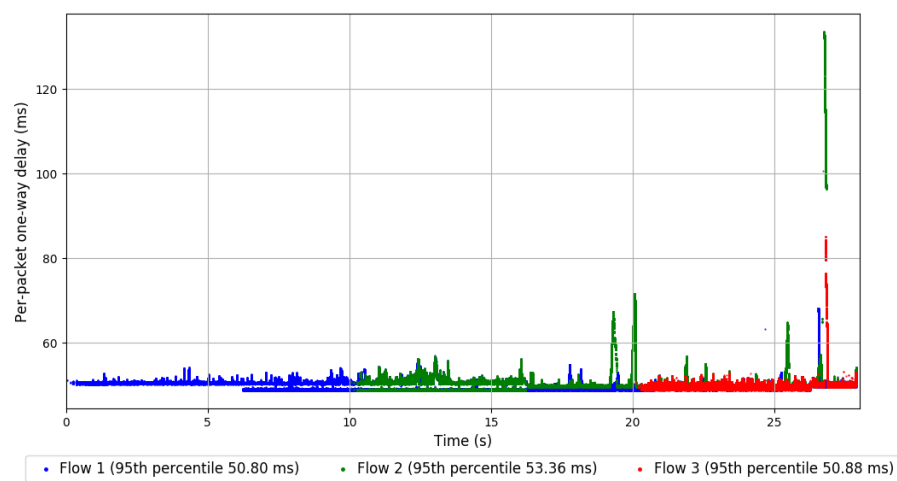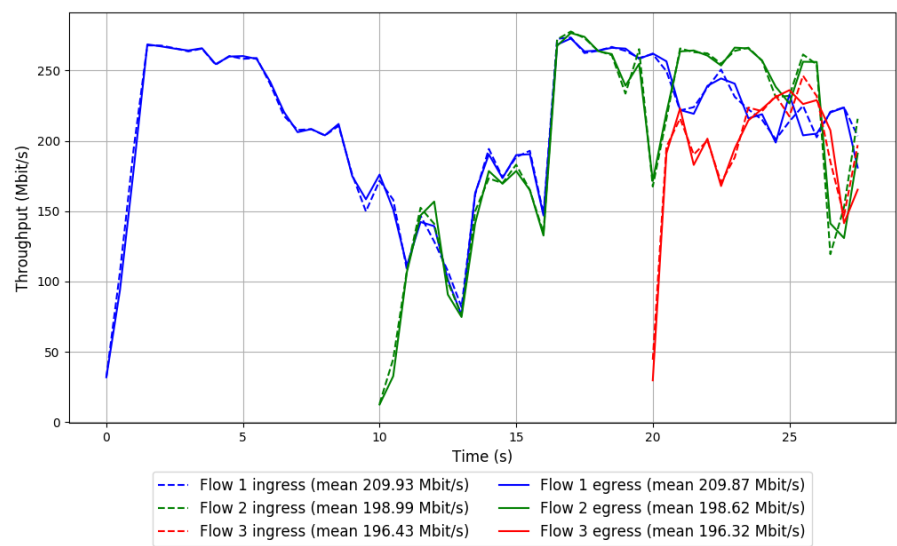
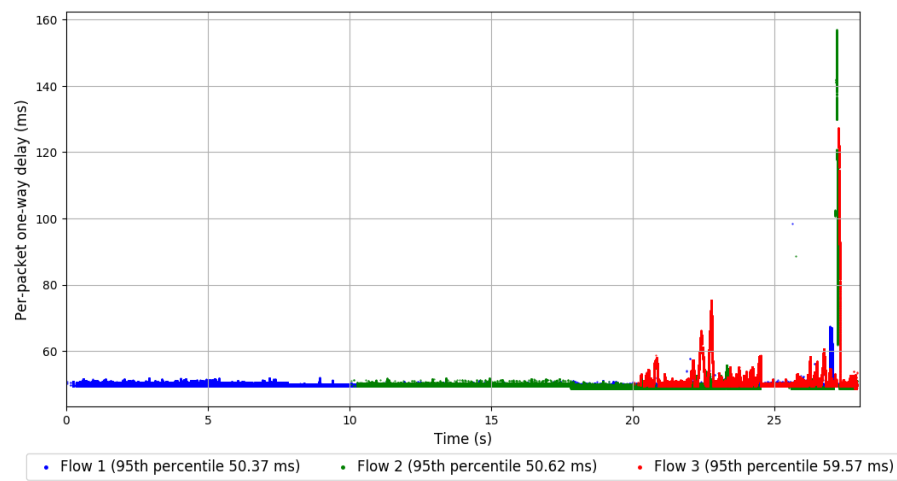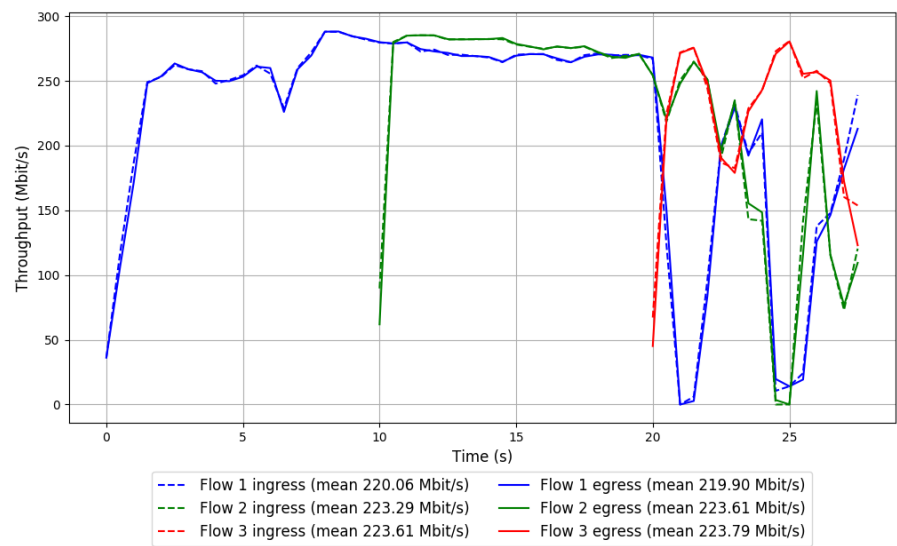Run 8: Report of TaoVA-100x — Data Link

```
Run 9: Statistics of TaoVA-100x

Start at: 2017-09-18 23:46:12
End at: 2017-09-18 23:46:42


# Below is generated by plot.py at 2017-09-19 02:53:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 426.13 Mbit/s
95th percentile per-packet one-way delay: 51.840 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 219.90 Mbit/s
95th percentile per-packet one-way delay: 50.370 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 223.61 Mbit/s
95th percentile per-packet one-way delay: 50.615 ms
Loss rate: 0.31%
-- Flow 3:
Average throughput: 223.79 Mbit/s
95th percentile per-packet one-way delay: 59.573 ms
Loss rate: 1.18%
```

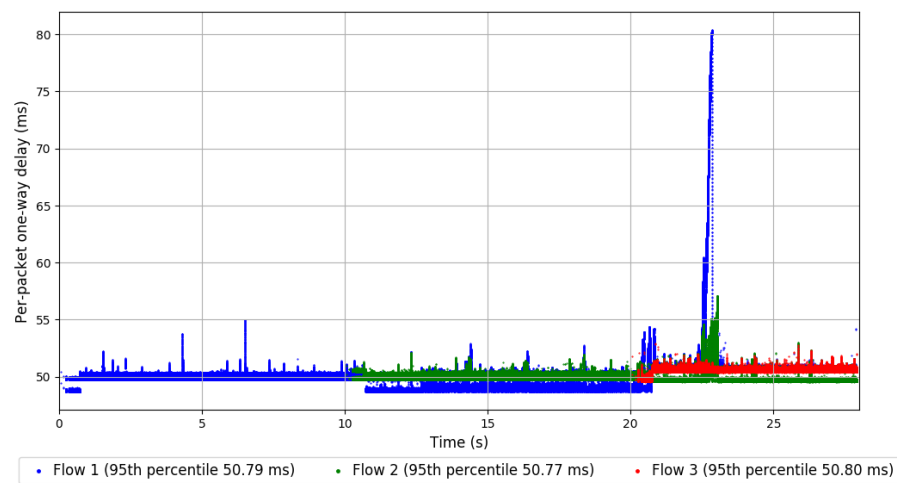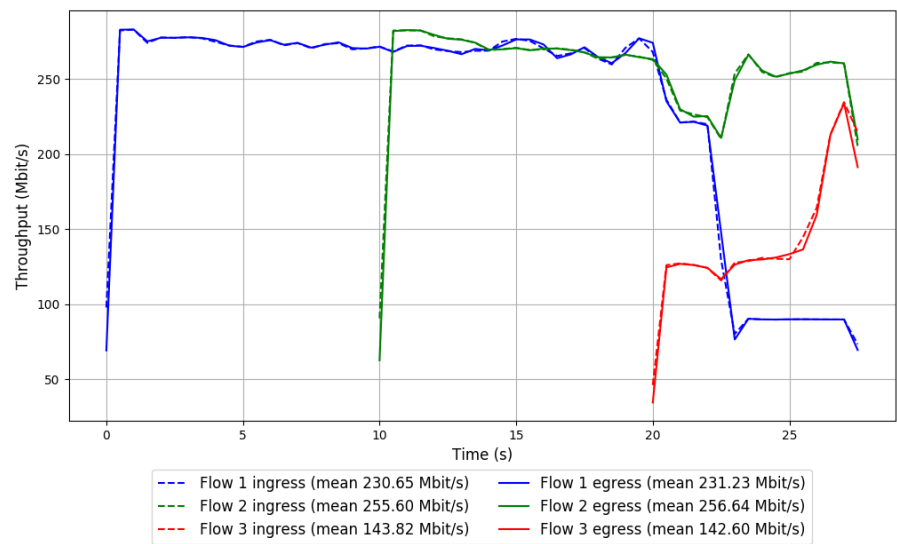Run 9: Report of TaoVA-100x — Data Link

161

```
Run 10: Statistics of TaoVA-100x

Start at: 2017-09-18 23:55:19
End at: 2017-09-18 23:55:49

# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 435.65 Mbit/s
95th percentile per-packet one-way delay: 50.784 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 231.23 Mbit/s
95th percentile per-packet one-way delay: 50.793 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 256.64 Mbit/s
95th percentile per-packet one-way delay: 50.769 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 142.60 Mbit/s
95th percentile per-packet one-way delay: 50.797 ms
Loss rate: 2.08%
```

Run 10: Report of TaoVA-100x — Data Link

- - - Flow 1 ingress (mean 230.65 Mbit/s) — Flow 1 egress (mean 231.23 Mbit/s)
- - - Flow 2 ingress (mean 255.60 Mbit/s) — Flow 2 egress (mean 256.64 Mbit/s)
- - - Flow 3 ingress (mean 143.82 Mbit/s) — Flow 3 egress (mean 142.60 Mbit/s)

- Flow 1 (95th percentile 50.79 ms)   • Flow 2 (95th percentile 50.77 ms)   • Flow 3 (95th percentile 50.80 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2017-09-18 22:33:37
End at: 2017-09-18 22:34:07


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 144.90 Mbit/s
95th percentile per-packet one-way delay: 51.001 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 62.86 Mbit/s
95th percentile per-packet one-way delay: 50.848 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 83.55 Mbit/s
95th percentile per-packet one-way delay: 50.856 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 80.72 Mbit/s
95th percentile per-packet one-way delay: 52.331 ms
Loss rate: 1.04%
```
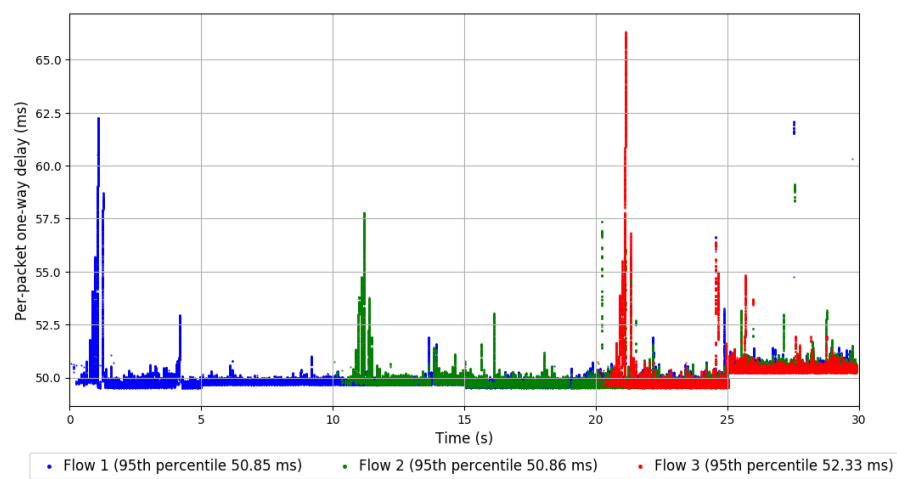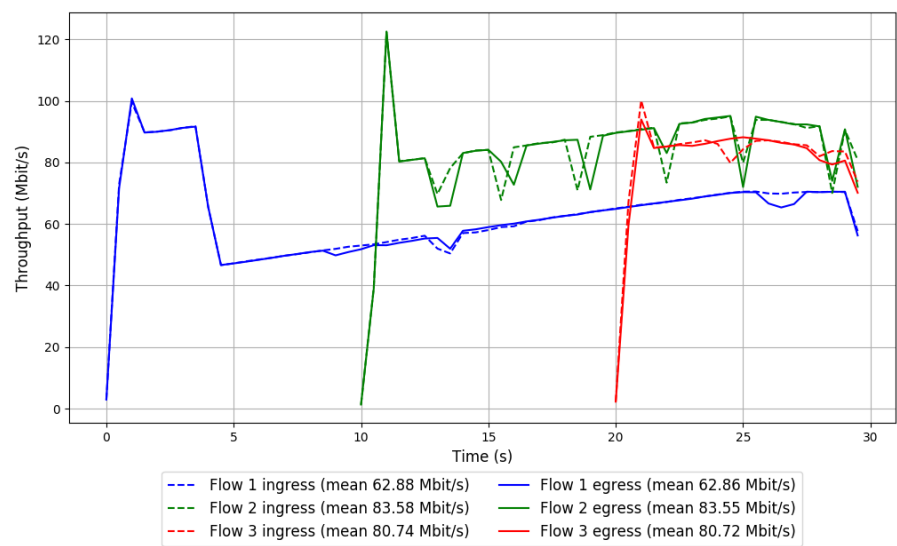
Run 1: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 62.88 Mbit/s) — Flow 1 egress (mean 62.86 Mbit/s)
Flow 2 ingress (mean 83.58 Mbit/s) — Flow 2 egress (mean 83.55 Mbit/s)
Flow 3 ingress (mean 80.74 Mbit/s) — Flow 3 egress (mean 80.72 Mbit/s)

Flow 1 (95th percentile 50.85 ms) • Flow 2 (95th percentile 50.86 ms) • Flow 3 (95th percentile 52.33 ms)

```
Run 2: Statistics of TCP Vegas

Start at: 2017-09-18 22:42:51
End at: 2017-09-18 22:43:21


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 98.40 Mbit/s
95th percentile per-packet one-way delay: 51.314 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 84.73 Mbit/s
95th percentile per-packet one-way delay: 51.374 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 17.85 Mbit/s
95th percentile per-packet one-way delay: 50.989 ms
Loss rate: 0.59%
-- Flow 3:
Average throughput: 5.55 Mbit/s
95th percentile per-packet one-way delay: 50.855 ms
Loss rate: 2.27%
```
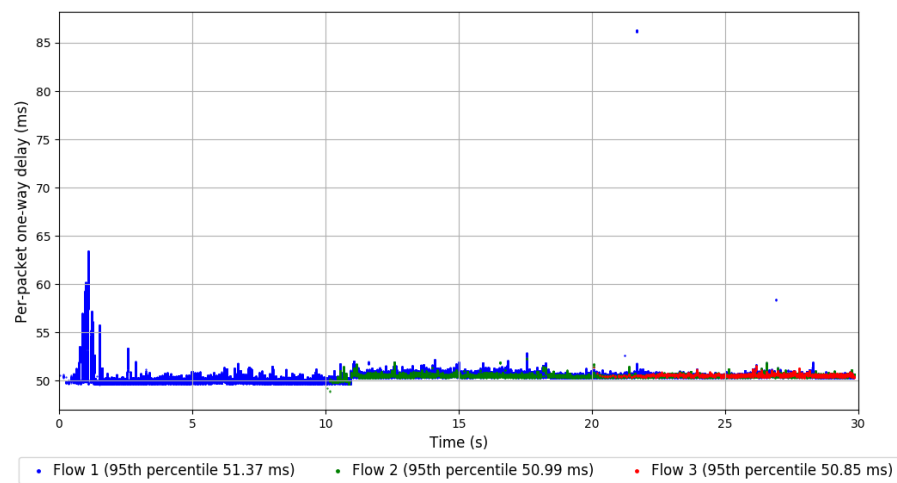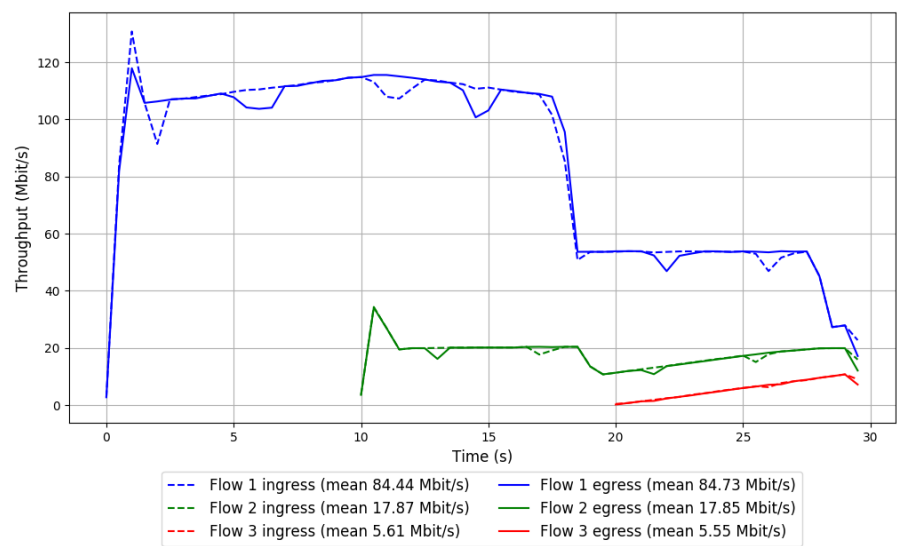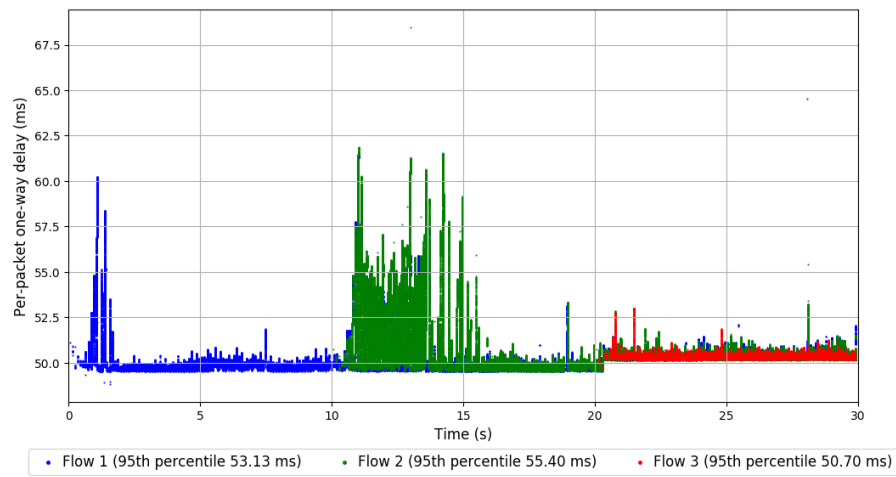
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2017-09-18 22:52:02
End at: 2017-09-18 22:52:32

# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 143.97 Mbit/s
95th percentile per-packet one-way delay: 54.547 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 55.93 Mbit/s
95th percentile per-packet one-way delay: 53.129 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 107.67 Mbit/s
95th percentile per-packet one-way delay: 55.395 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 50.14 Mbit/s
95th percentile per-packet one-way delay: 50.703 ms
Loss rate: 1.18%
```
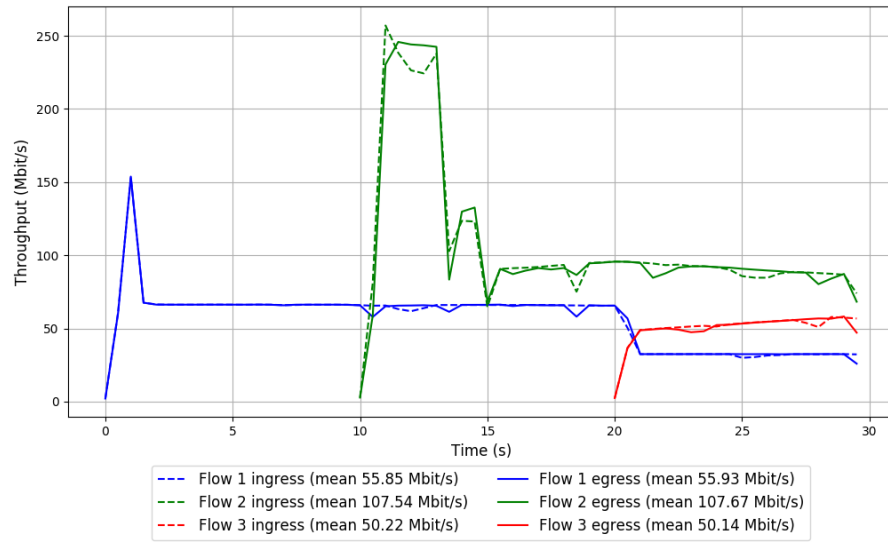
Run 3: Report of TCP Vegas — Data Link

```
Run 4: Statistics of TCP Vegas

Start at: 2017-09-18 23:01:05
End at: 2017-09-18 23:01:35


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 161.23 Mbit/s
95th percentile per-packet one-way delay: 51.317 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 53.63 Mbit/s
95th percentile per-packet one-way delay: 51.168 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 90.80 Mbit/s
95th percentile per-packet one-way delay: 51.719 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 143.53 Mbit/s
95th percentile per-packet one-way delay: 51.041 ms
Loss rate: 1.12%
```
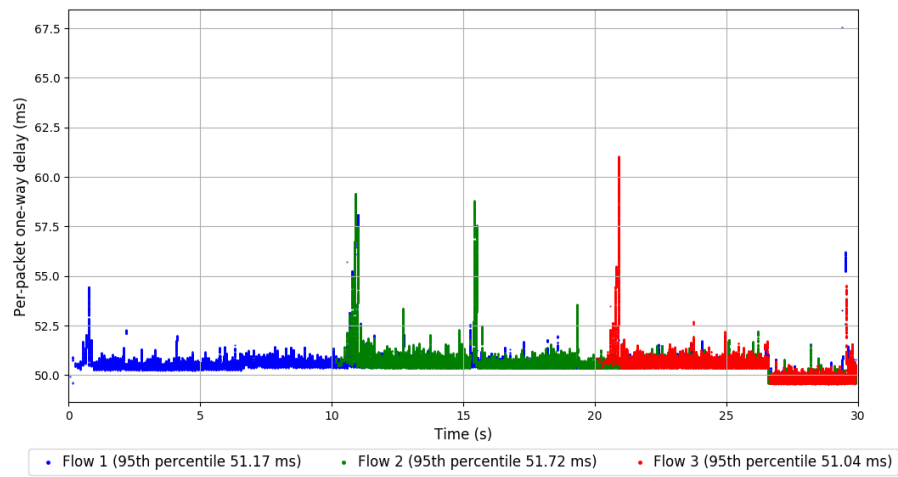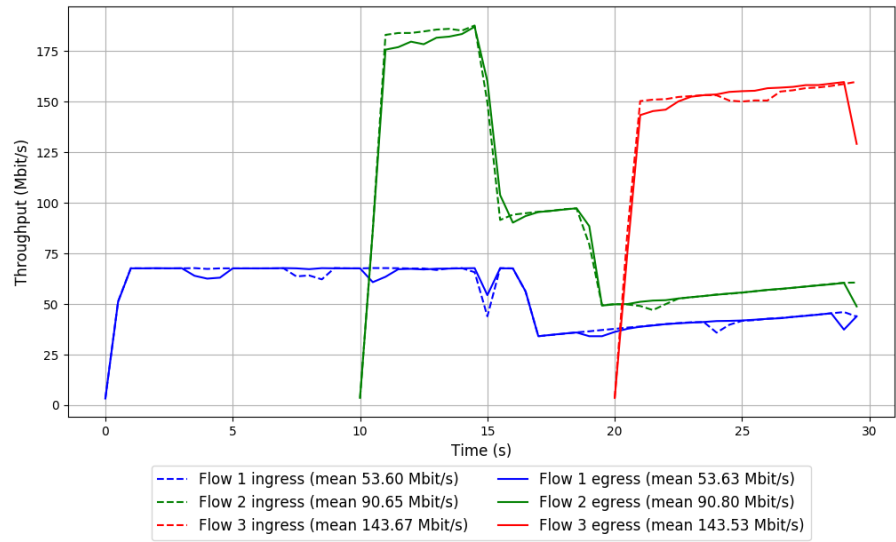
Run 4: Report of TCP Vegas — Data Link

```
Run 5: Statistics of TCP Vegas

Start at: 2017-09-18 23:10:30
End at: 2017-09-18 23:11:00


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 176.88 Mbit/s
95th percentile per-packet one-way delay: 51.239 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 68.04 Mbit/s
95th percentile per-packet one-way delay: 51.161 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 131.68 Mbit/s
95th percentile per-packet one-way delay: 50.848 ms
Loss rate: 0.56%
-- Flow 3:
Average throughput: 64.91 Mbit/s
95th percentile per-packet one-way delay: 52.246 ms
Loss rate: 0.71%
```
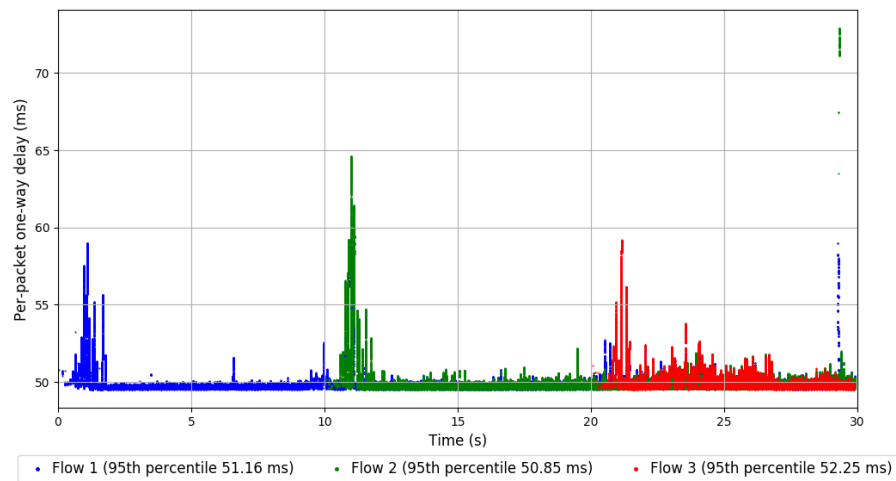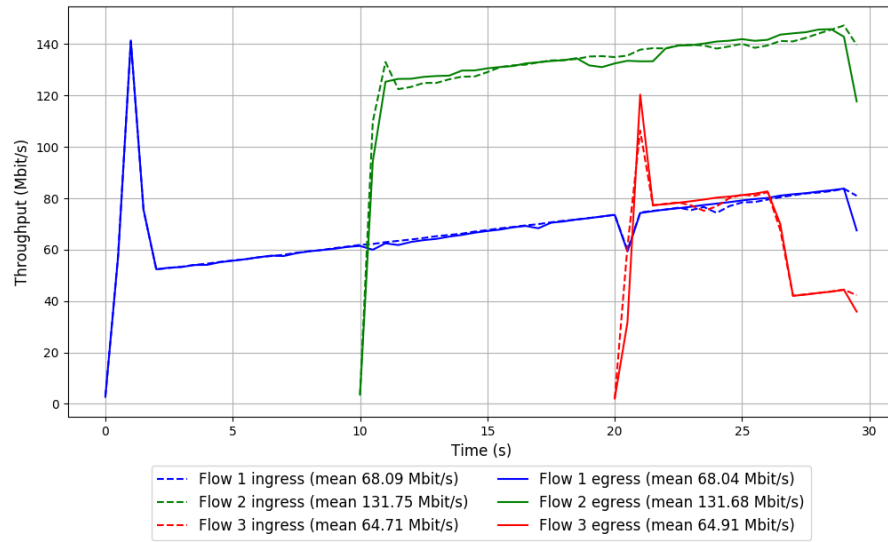
Run 5: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 68.09 Mbit/s)   Flow 1 egress (mean 68.04 Mbit/s)
Flow 2 ingress (mean 131.75 Mbit/s)   Flow 2 egress (mean 131.68 Mbit/s)
Flow 3 ingress (mean 64.71 Mbit/s)   Flow 3 egress (mean 64.91 Mbit/s)

Flow 1 (95th percentile 51.16 ms)   Flow 2 (95th percentile 50.85 ms)   Flow 3 (95th percentile 52.25 ms)

173

```
Run 6: Statistics of TCP Vegas

Start at: 2017-09-18 23:19:44
End at: 2017-09-18 23:20:14


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 149.41 Mbit/s
95th percentile per-packet one-way delay: 56.714 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 37.86 Mbit/s
95th percentile per-packet one-way delay: 53.417 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 133.52 Mbit/s
95th percentile per-packet one-way delay: 57.086 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 69.32 Mbit/s
95th percentile per-packet one-way delay: 51.370 ms
Loss rate: 1.12%
```
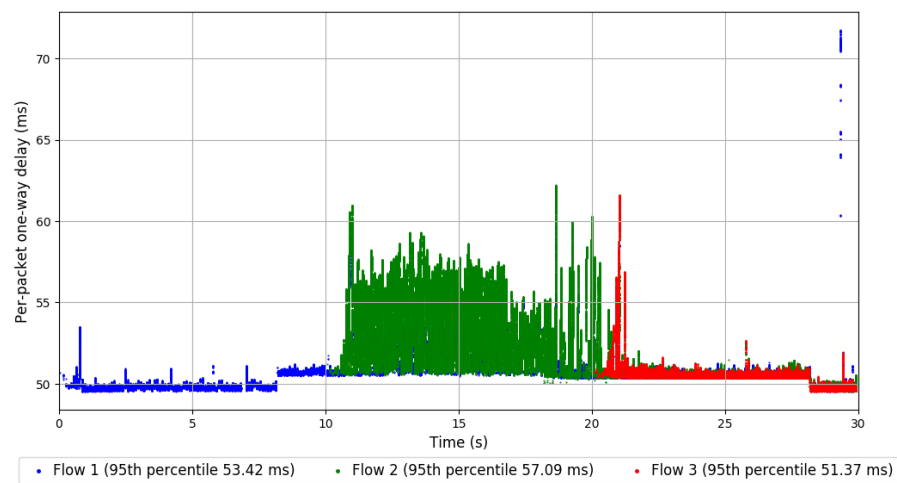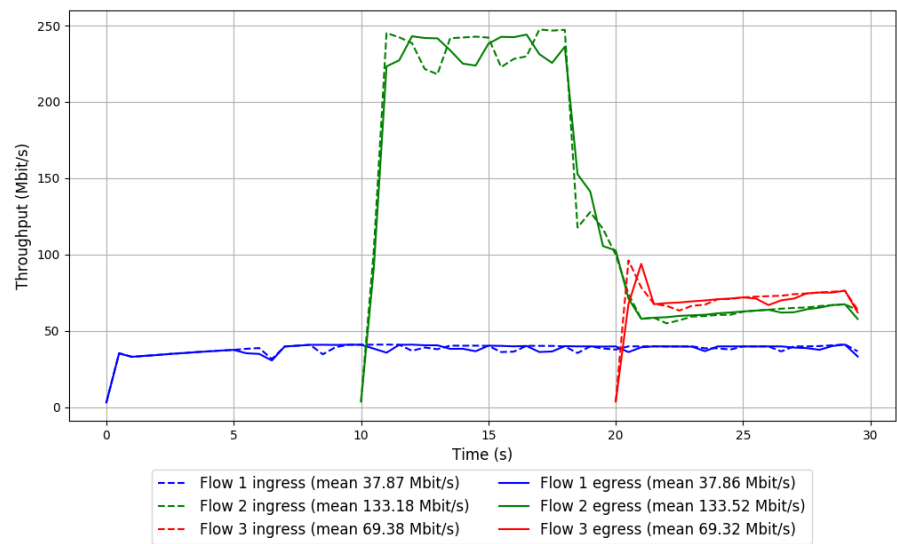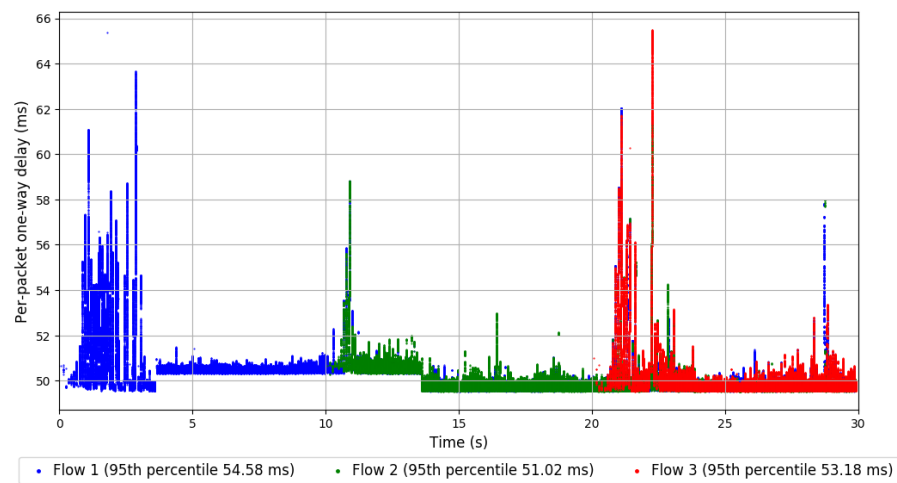
Run 6: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 37.87 Mbit/s) --- Flow 1 egress (mean 37.86 Mbit/s)
Flow 2 ingress (mean 133.18 Mbit/s) --- Flow 2 egress (mean 133.52 Mbit/s)
Flow 3 ingress (mean 69.38 Mbit/s) --- Flow 3 egress (mean 69.32 Mbit/s)

Flow 1 (95th percentile 53.42 ms)   Flow 2 (95th percentile 57.09 ms)   Flow 3 (95th percentile 51.37 ms)

175

```
Run 7: Statistics of TCP Vegas

Start at: 2017-09-18 23:28:58
End at: 2017-09-18 23:29:28


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 195.56 Mbit/s
95th percentile per-packet one-way delay: 52.951 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 78.65 Mbit/s
95th percentile per-packet one-way delay: 54.575 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 121.49 Mbit/s
95th percentile per-packet one-way delay: 51.020 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 110.14 Mbit/s
95th percentile per-packet one-way delay: 53.176 ms
Loss rate: 1.10%
```
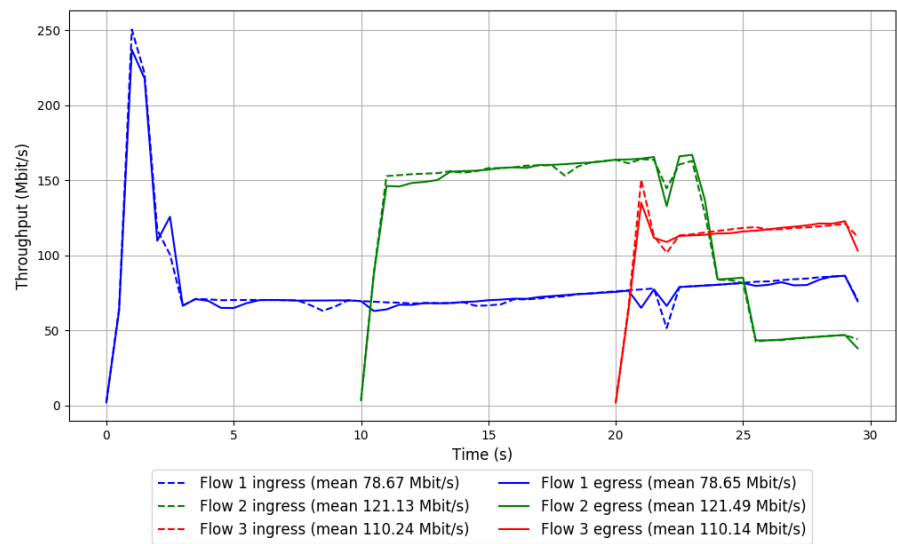
Run 7: Report of TCP Vegas — Data Link

```
Run 8: Statistics of TCP Vegas

Start at: 2017-09-18 23:38:08
End at: 2017-09-18 23:38:38


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 151.15 Mbit/s
95th percentile per-packet one-way delay: 53.614 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 93.73 Mbit/s
95th percentile per-packet one-way delay: 51.539 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 68.33 Mbit/s
95th percentile per-packet one-way delay: 56.128 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 36.45 Mbit/s
95th percentile per-packet one-way delay: 50.537 ms
Loss rate: 1.09%
```
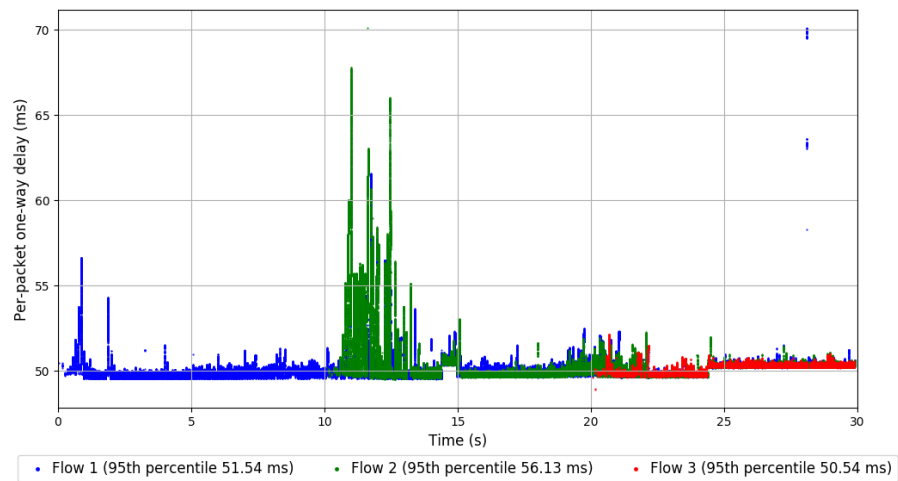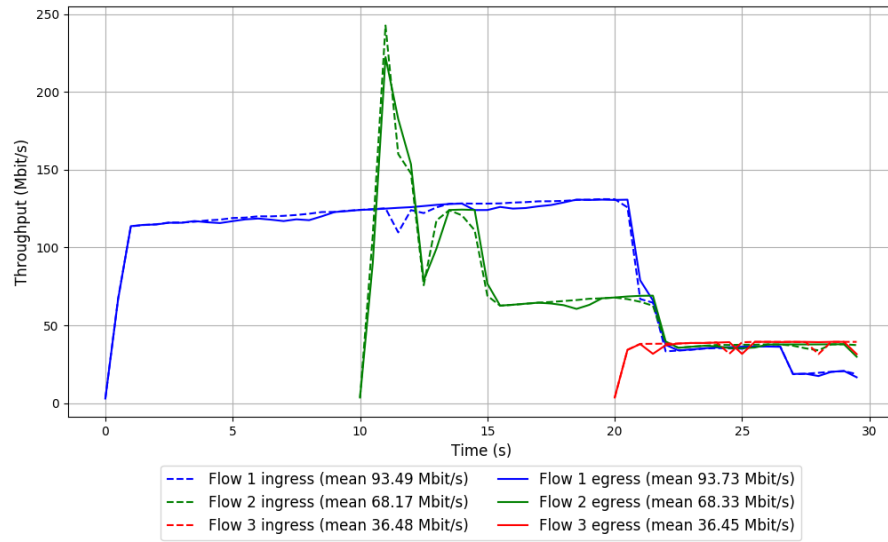
Run 8: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 93.49 Mbit/s) --- Flow 1 egress (mean 93.73 Mbit/s)
Flow 2 ingress (mean 68.17 Mbit/s) --- Flow 2 egress (mean 68.33 Mbit/s)
Flow 3 ingress (mean 36.48 Mbit/s) --- Flow 3 egress (mean 36.45 Mbit/s)

Flow 1 (95th percentile 51.54 ms) · Flow 2 (95th percentile 56.13 ms) · Flow 3 (95th percentile 50.54 ms)

```
Run 9: Statistics of TCP Vegas

Start at: 2017-09-18 23:47:29
End at: 2017-09-18 23:47:59


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 188.35 Mbit/s
95th percentile per-packet one-way delay: 50.580 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 73.39 Mbit/s
95th percentile per-packet one-way delay: 50.656 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 119.78 Mbit/s
95th percentile per-packet one-way delay: 50.452 ms
Loss rate: 0.35%
-- Flow 3:
Average throughput: 107.52 Mbit/s
95th percentile per-packet one-way delay: 50.504 ms
Loss rate: 1.16%
```
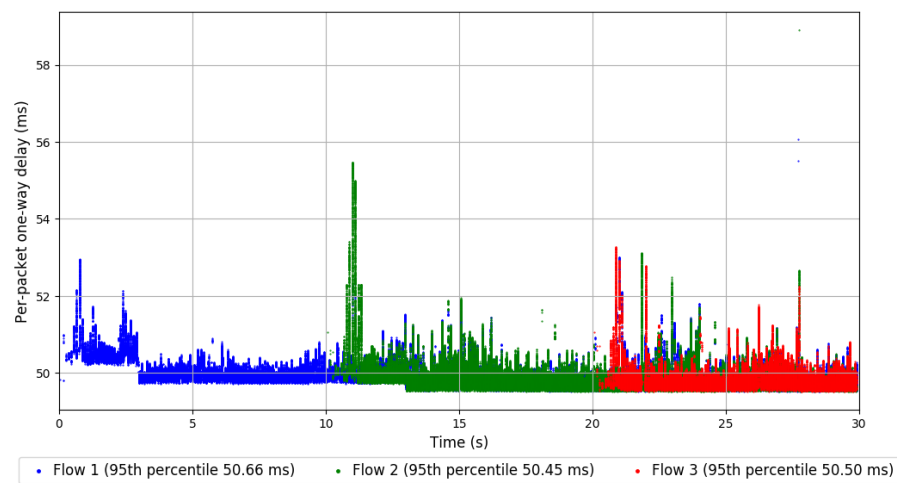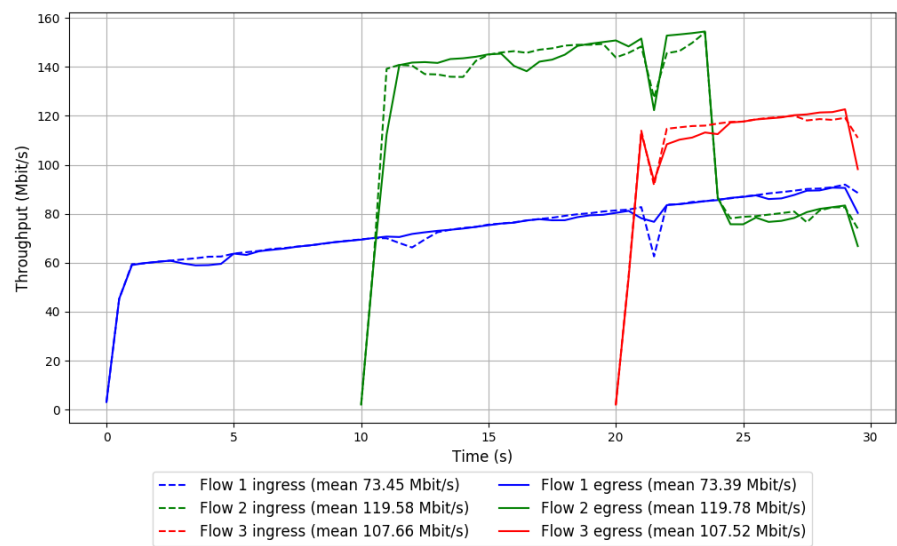
Run 9: Report of TCP Vegas — Data Link

```
Run 10: Statistics of TCP Vegas

Start at: 2017-09-18 23:56:38
End at: 2017-09-18 23:57:08


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 105.93 Mbit/s
95th percentile per-packet one-way delay: 54.462 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 89.28 Mbit/s
95th percentile per-packet one-way delay: 54.828 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 11.49 Mbit/s
95th percentile per-packet one-way delay: 50.953 ms
Loss rate: 1.02%
-- Flow 3:
Average throughput: 27.41 Mbit/s
95th percentile per-packet one-way delay: 51.430 ms
Loss rate: 0.94%
```
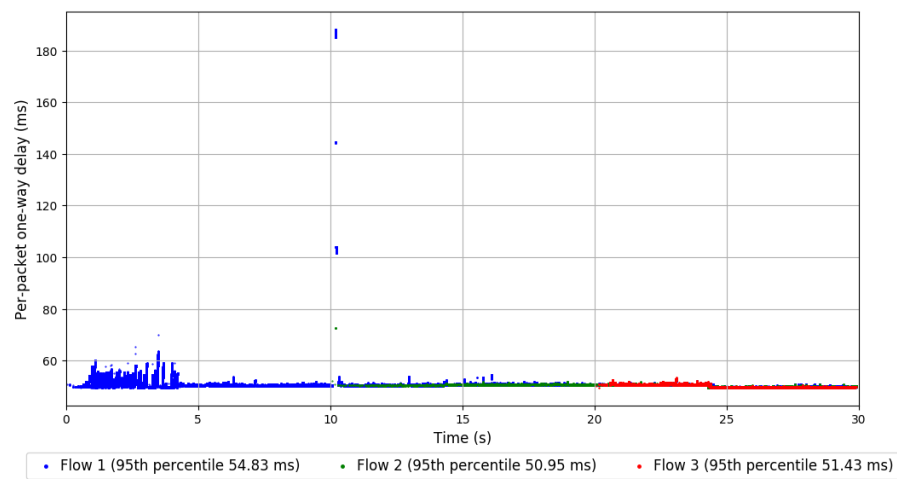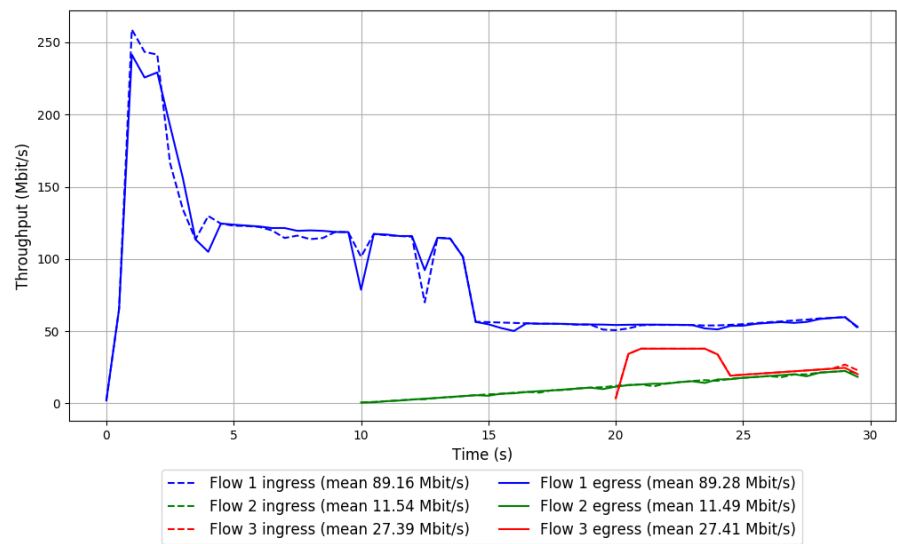
Run 10: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 89.16 Mbit/s) — — — Flow 1 egress (mean 89.28 Mbit/s)
Flow 2 ingress (mean 11.54 Mbit/s) — — — Flow 2 egress (mean 11.49 Mbit/s)
Flow 3 ingress (mean 27.39 Mbit/s) — — — Flow 3 egress (mean 27.41 Mbit/s)

Flow 1 (95th percentile 54.83 ms) • Flow 2 (95th percentile 50.95 ms) • Flow 3 (95th percentile 51.43 ms)

183

```
Run 1: Statistics of Verus

Start at: 2017-09-18 22:39:33
End at: 2017-09-18 22:40:03


# Below is generated by plot.py at 2017-09-19 02:53:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 365.25 Mbit/s
95th percentile per-packet one-way delay: 128.292 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 201.88 Mbit/s
95th percentile per-packet one-way delay: 79.486 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 161.97 Mbit/s
95th percentile per-packet one-way delay: 192.929 ms
Loss rate: 4.32%
-- Flow 3:
Average throughput: 175.55 Mbit/s
95th percentile per-packet one-way delay: 166.873 ms
Loss rate: 3.51%
```
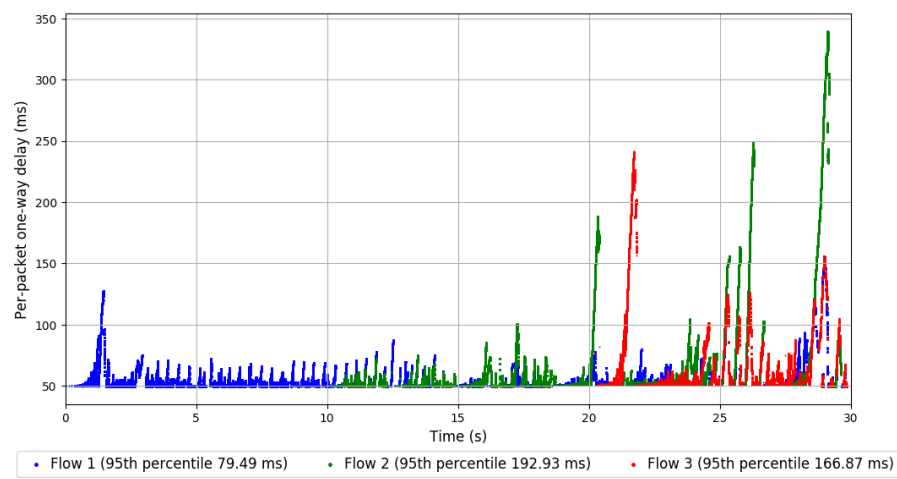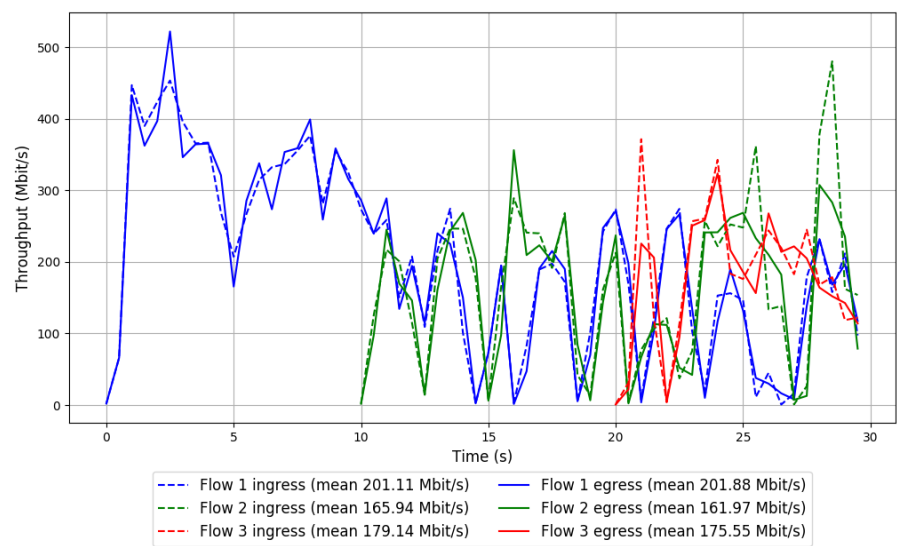
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2017-09-18 22:48:46
End at: 2017-09-18 22:49:16


# Below is generated by plot.py at 2017-09-19 02:54:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 355.37 Mbit/s
95th percentile per-packet one-way delay: 135.794 ms
Loss rate: 1.21%
-- Flow 1:
Average throughput: 205.80 Mbit/s
95th percentile per-packet one-way delay: 102.711 ms
Loss rate: 0.72%
-- Flow 2:
Average throughput: 170.42 Mbit/s
95th percentile per-packet one-way delay: 155.147 ms
Loss rate: 2.14%
-- Flow 3:
Average throughput: 110.35 Mbit/s
95th percentile per-packet one-way delay: 137.681 ms
Loss rate: 1.01%
```
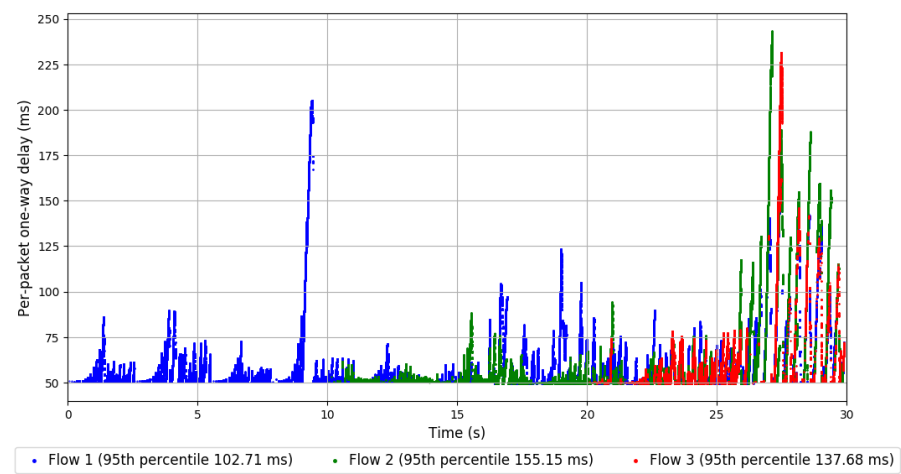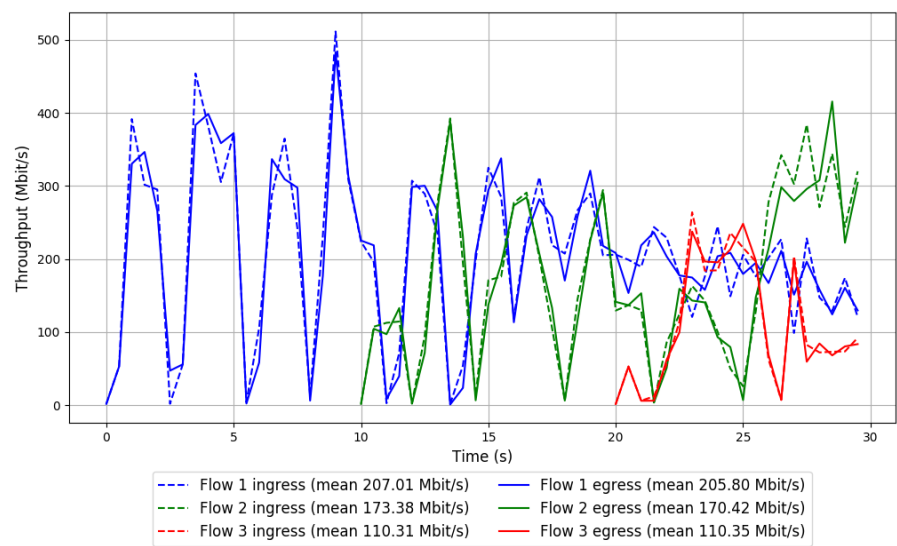
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2017-09-18 22:57:52
End at: 2017-09-18 22:58:22


# Below is generated by plot.py at 2017-09-19 02:55:11
# Datalink statistics
-- Total of 3 flows:
Average throughput: 414.40 Mbit/s
95th percentile per-packet one-way delay: 166.485 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 219.19 Mbit/s
95th percentile per-packet one-way delay: 115.723 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 240.89 Mbit/s
95th percentile per-packet one-way delay: 187.296 ms
Loss rate: 0.58%
-- Flow 3:
Average throughput: 113.46 Mbit/s
95th percentile per-packet one-way delay: 88.026 ms
Loss rate: 1.36%
```
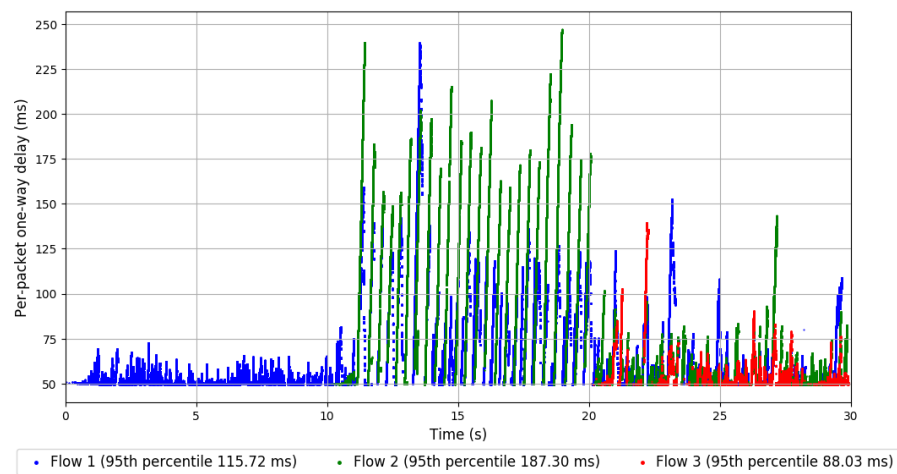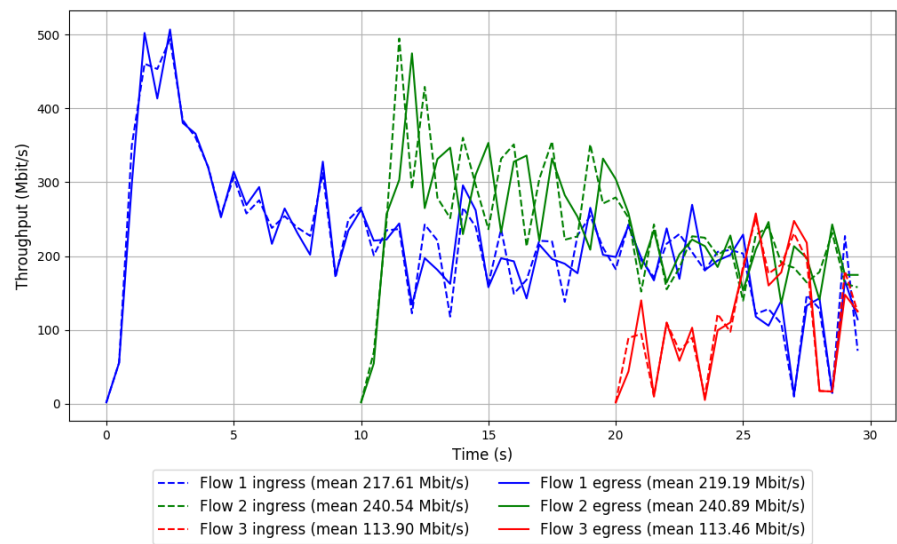
Run 3: Report of Verus — Data Link

```
Run 4: Statistics of Verus

Start at: 2017-09-18 23:07:12
End at: 2017-09-18 23:07:42


# Below is generated by plot.py at 2017-09-19 02:55:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 424.84 Mbit/s
95th percentile per-packet one-way delay: 168.074 ms
Loss rate: 4.48%
-- Flow 1:
Average throughput: 243.48 Mbit/s
95th percentile per-packet one-way delay: 140.255 ms
Loss rate: 2.65%
-- Flow 2:
Average throughput: 205.12 Mbit/s
95th percentile per-packet one-way delay: 126.473 ms
Loss rate: 1.28%
-- Flow 3:
Average throughput: 137.35 Mbit/s
95th percentile per-packet one-way delay: 326.013 ms
Loss rate: 20.38%
```
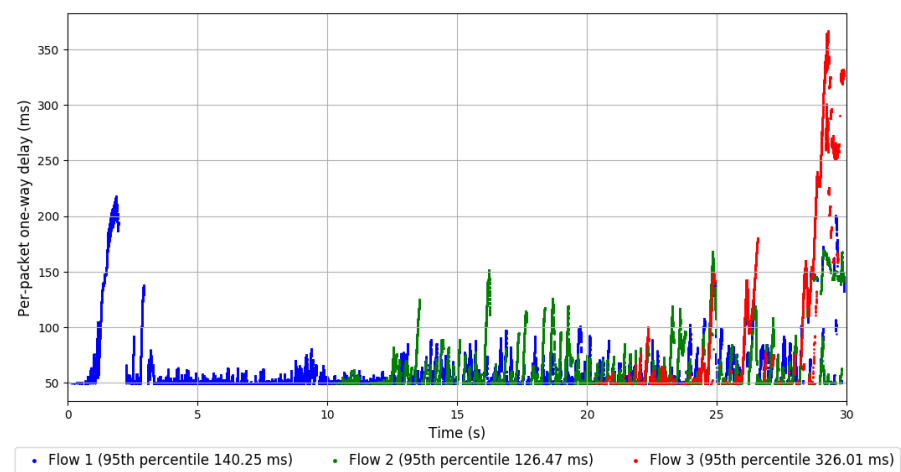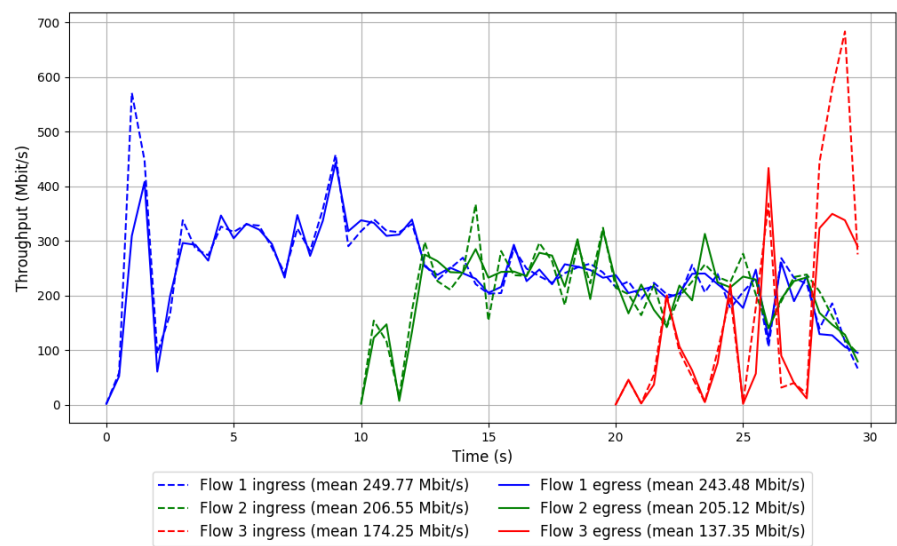
Run 4: Report of Verus — Data Link

```
Run 5: Statistics of Verus

Start at: 2017-09-18 23:16:23
End at: 2017-09-18 23:16:53


# Below is generated by plot.py at 2017-09-19 02:55:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 366.78 Mbit/s
95th percentile per-packet one-way delay: 164.117 ms
Loss rate: 1.53%
-- Flow 1:
Average throughput: 189.31 Mbit/s
95th percentile per-packet one-way delay: 101.427 ms
Loss rate: 0.39%
-- Flow 2:
Average throughput: 191.30 Mbit/s
95th percentile per-packet one-way delay: 198.809 ms
Loss rate: 3.06%
-- Flow 3:
Average throughput: 153.06 Mbit/s
95th percentile per-packet one-way delay: 126.841 ms
Loss rate: 1.80%
```
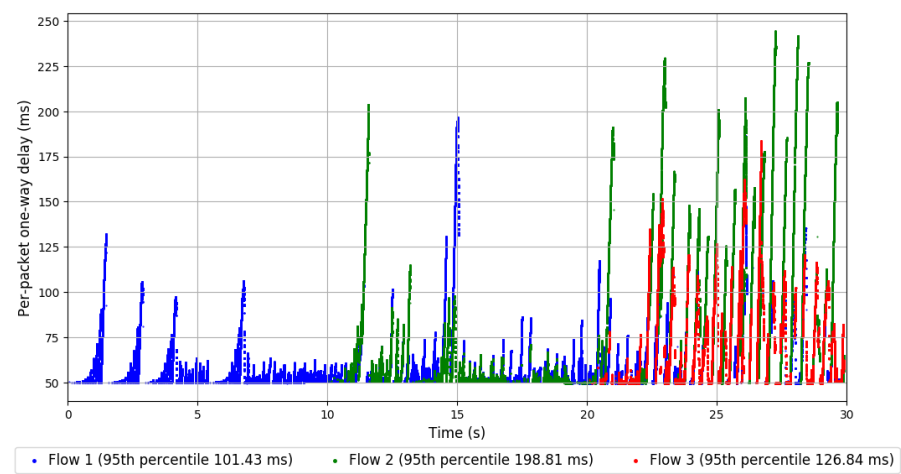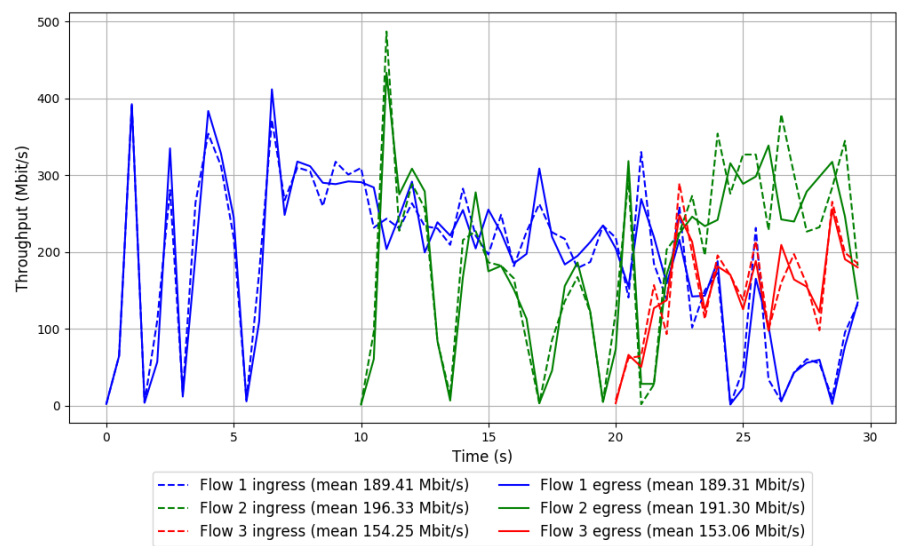
Run 5: Report of Verus — Data Link

```
Run 6: Statistics of Verus

Start at: 2017-09-18 23:25:38
End at: 2017-09-18 23:26:08


# Below is generated by plot.py at 2017-09-19 02:55:36
# Datalink statistics
-- Total of 3 flows:
Average throughput: 349.37 Mbit/s
95th percentile per-packet one-way delay: 100.153 ms
Loss rate: 2.39%
-- Flow 1:
Average throughput: 203.53 Mbit/s
95th percentile per-packet one-way delay: 90.775 ms
Loss rate: 1.94%
-- Flow 2:
Average throughput: 142.95 Mbit/s
95th percentile per-packet one-way delay: 109.502 ms
Loss rate: 3.45%
-- Flow 3:
Average throughput: 156.24 Mbit/s
95th percentile per-packet one-way delay: 102.733 ms
Loss rate: 2.21%
```
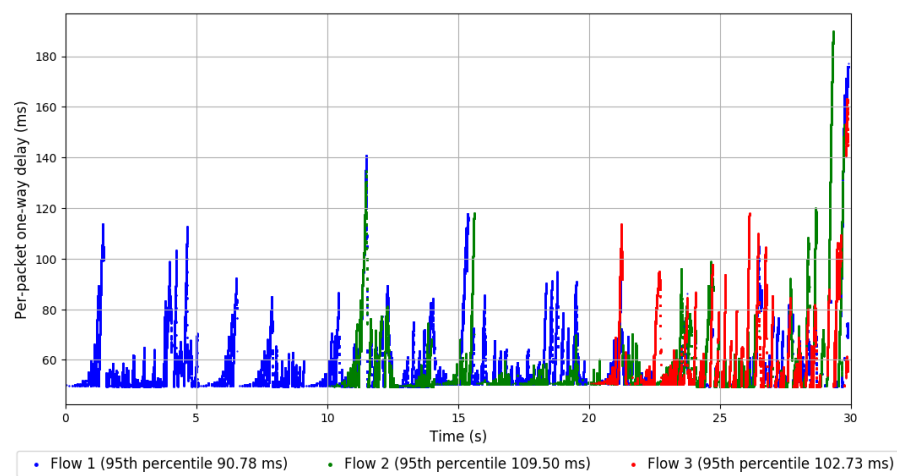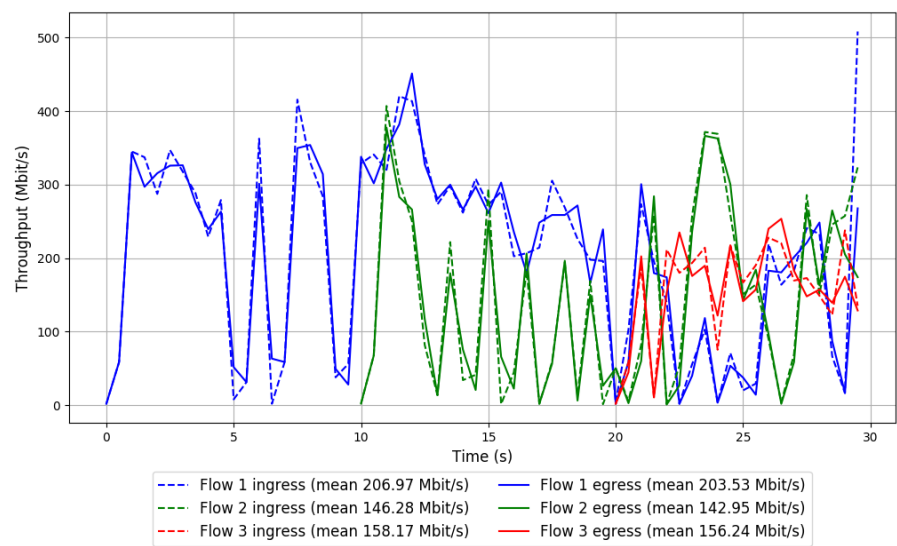
Run 6: Report of Verus — Data Link

```
Run 7: Statistics of Verus

Start at: 2017-09-18 23:34:54
End at: 2017-09-18 23:35:24


# Below is generated by plot.py at 2017-09-19 02:56:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 354.21 Mbit/s
95th percentile per-packet one-way delay: 125.625 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 191.12 Mbit/s
95th percentile per-packet one-way delay: 71.616 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 199.64 Mbit/s
95th percentile per-packet one-way delay: 143.442 ms
Loss rate: 1.00%
-- Flow 3:
Average throughput: 93.16 Mbit/s
95th percentile per-packet one-way delay: 159.156 ms
Loss rate: 0.24%
```
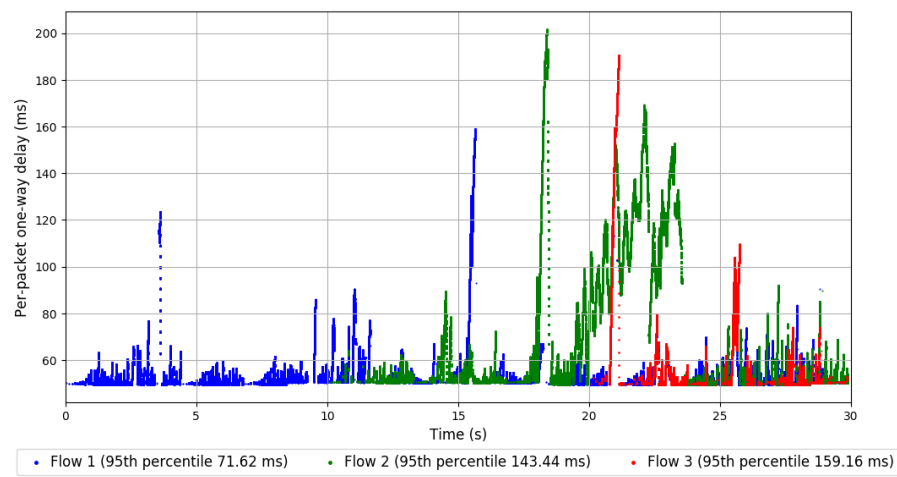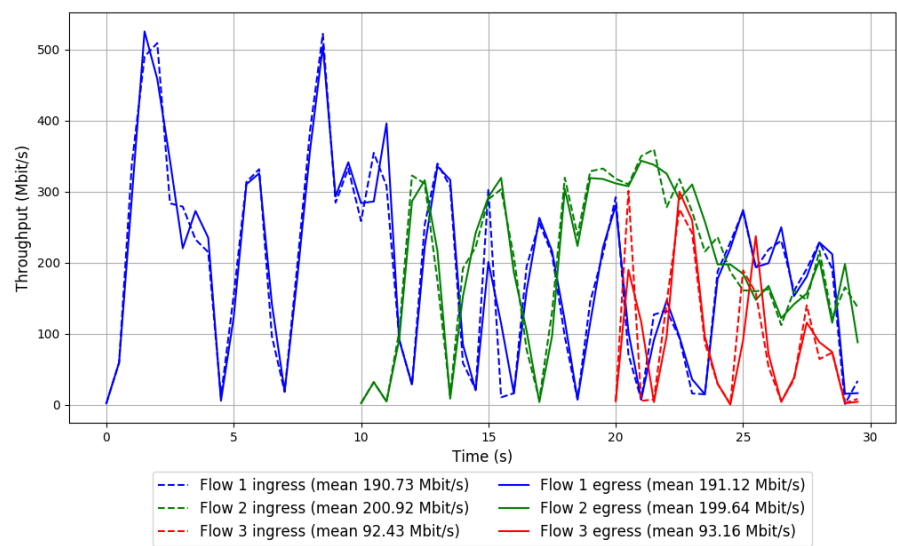
Run 7: Report of Verus — Data Link

- - - Flow 1 ingress (mean 190.73 Mbit/s)   —— Flow 1 egress (mean 191.12 Mbit/s)
- - - Flow 2 ingress (mean 200.92 Mbit/s)   —— Flow 2 egress (mean 199.64 Mbit/s)
- - - Flow 3 ingress (mean 92.43 Mbit/s)   —— Flow 3 egress (mean 93.16 Mbit/s)

• Flow 1 (95th percentile 71.62 ms)   • Flow 2 (95th percentile 143.44 ms)   • Flow 3 (95th percentile 159.16 ms)

197

```
Run 8: Statistics of Verus

Start at: 2017-09-18 23:44:06
End at: 2017-09-18 23:44:36


# Below is generated by plot.py at 2017-09-19 02:57:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 418.47 Mbit/s
95th percentile per-packet one-way delay: 155.320 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 281.30 Mbit/s
95th percentile per-packet one-way delay: 167.798 ms
Loss rate: 0.99%
-- Flow 2:
Average throughput: 151.41 Mbit/s
95th percentile per-packet one-way delay: 111.319 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 111.44 Mbit/s
95th percentile per-packet one-way delay: 121.493 ms
Loss rate: 0.70%
```
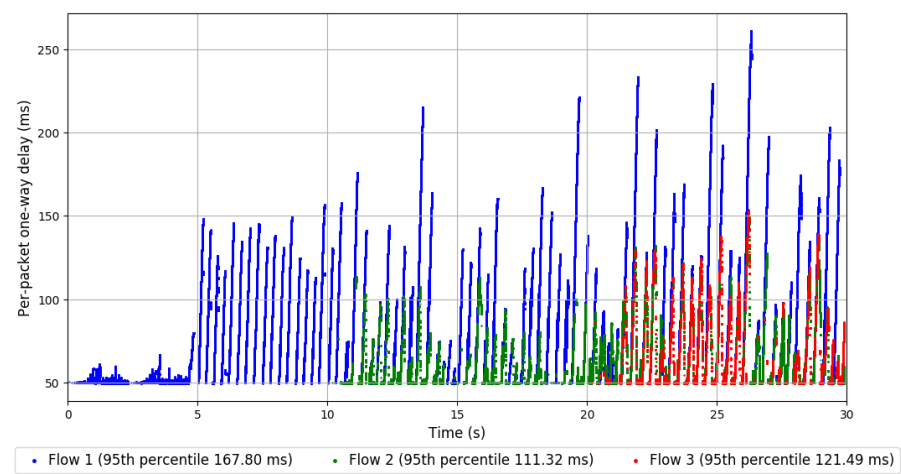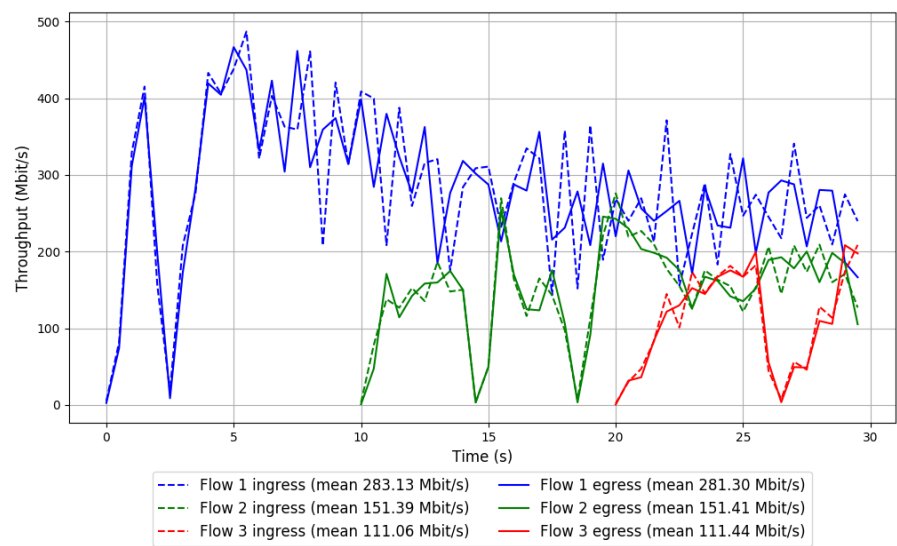
Run 8: Report of Verus — Data Link

- - - Flow 1 ingress (mean 283.13 Mbit/s) —— Flow 1 egress (mean 281.30 Mbit/s)
- - - Flow 2 ingress (mean 151.39 Mbit/s) —— Flow 2 egress (mean 151.41 Mbit/s)
- - - Flow 3 ingress (mean 111.06 Mbit/s) —— Flow 3 egress (mean 111.44 Mbit/s)

- Flow 1 (95th percentile 167.80 ms)   • Flow 2 (95th percentile 111.32 ms)   • Flow 3 (95th percentile 121.49 ms)

199

```
Run 9: Statistics of Verus

Start at: 2017-09-18 23:53:19
End at: 2017-09-18 23:53:49


# Below is generated by plot.py at 2017-09-19 02:57:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 376.84 Mbit/s
95th percentile per-packet one-way delay: 135.077 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 254.66 Mbit/s
95th percentile per-packet one-way delay: 132.869 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 133.96 Mbit/s
95th percentile per-packet one-way delay: 143.820 ms
Loss rate: 1.53%
-- Flow 3:
Average throughput: 115.21 Mbit/s
95th percentile per-packet one-way delay: 138.205 ms
Loss rate: 0.36%
```
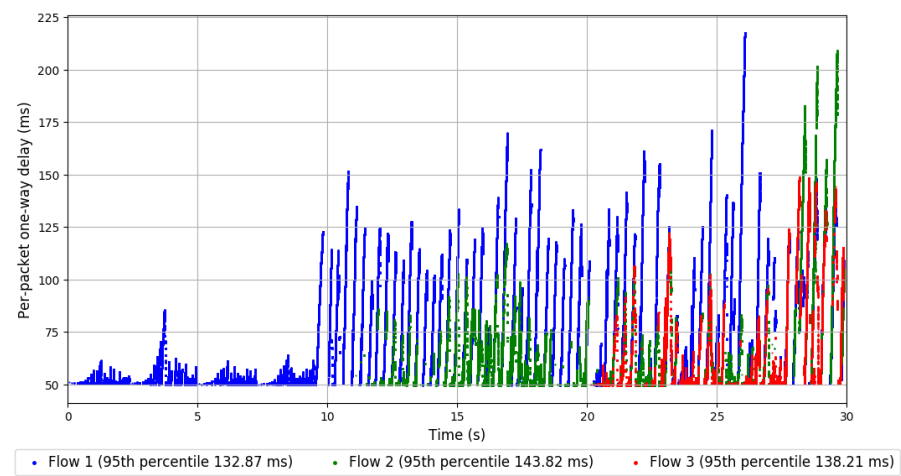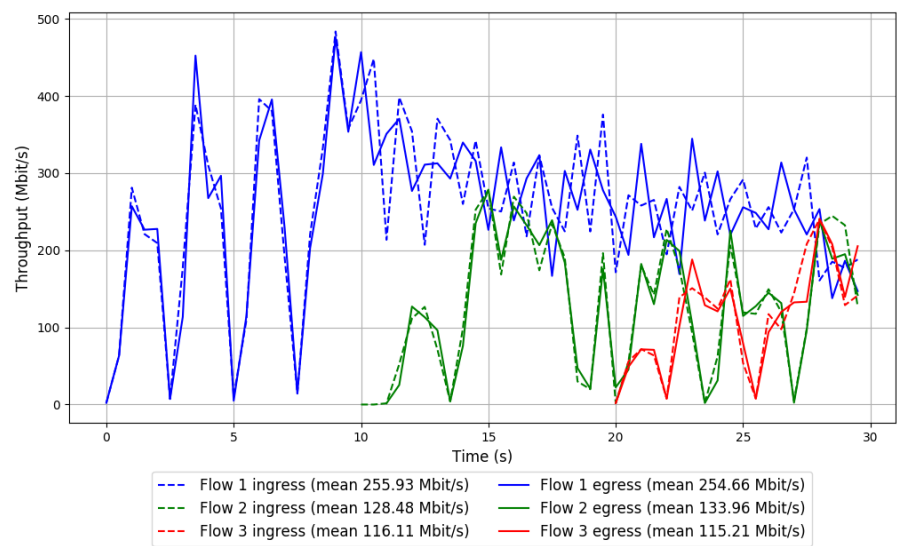
Run 9: Report of Verus — Data Link

```
Run 10: Statistics of Verus

Start at: 2017-09-19 00:02:24
End at: 2017-09-19 00:02:54


# Below is generated by plot.py at 2017-09-19 02:57:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 429.65 Mbit/s
95th percentile per-packet one-way delay: 108.087 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 259.84 Mbit/s
95th percentile per-packet one-way delay: 112.891 ms
Loss rate: 0.02%
-- Flow 2:
Average throughput: 195.09 Mbit/s
95th percentile per-packet one-way delay: 97.237 ms
Loss rate: 0.34%
-- Flow 3:
Average throughput: 121.85 Mbit/s
95th percentile per-packet one-way delay: 91.444 ms
Loss rate: 2.52%
```

Run 10: Report of Verus — Data Link