Pantheon Report

Generated at 2017-11-20 23:25:24 (UTC).

Data path: AWS India 1 Ethernet (*local*) →India ppp0 (*remote*).

Repeated the test of 14 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
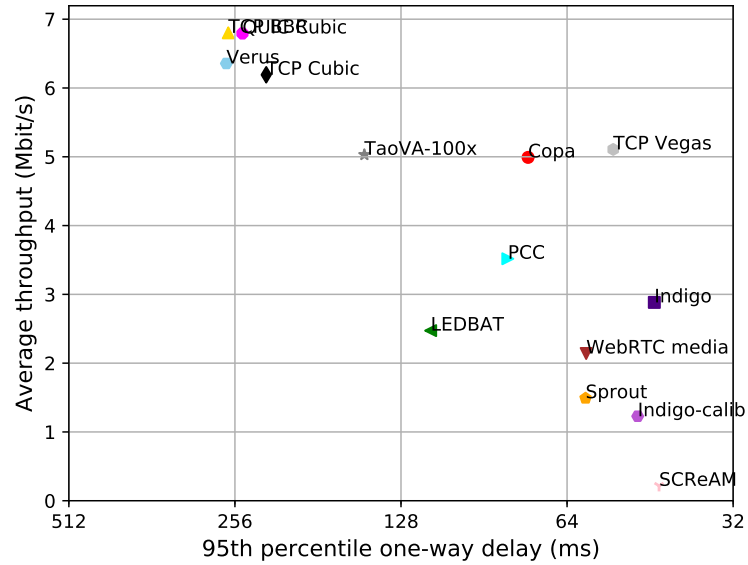
Tested BBR with qdisc of Fair Queuing (`fq`), and other schemes with the default Linux qdisc (`pfifo_fast`).

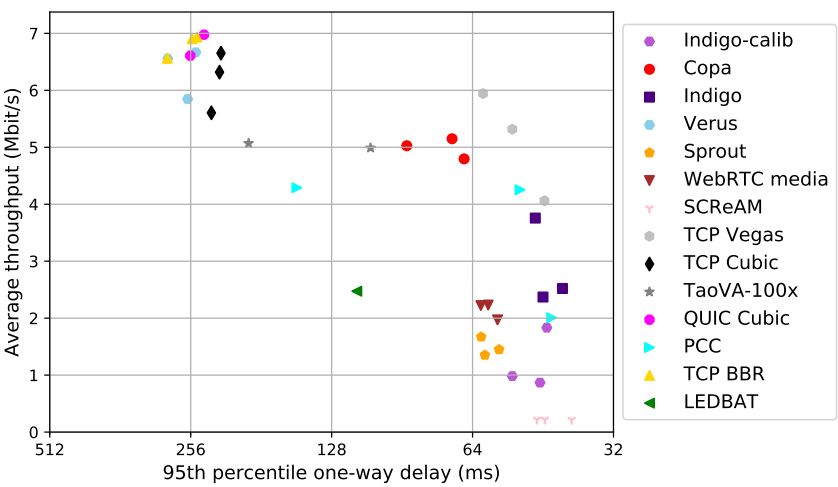NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

```
Git summary:
branch: indigos @ e3a57ad5ac5cfcaca0e3f983c8dd4cc3509e0262
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/genericCC @ b5b7c38e8391001927dc41c6cfa2627d03dde737
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fabb936fdca204b80db
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda
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 AWS India 1 Ethernet to India ppp0, 3 runs of 30s each per scheme
(mean of all runs by scheme)

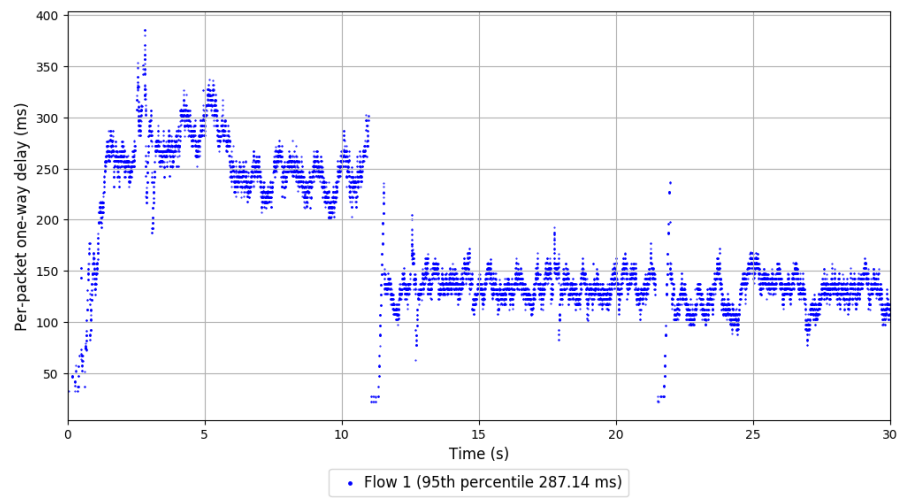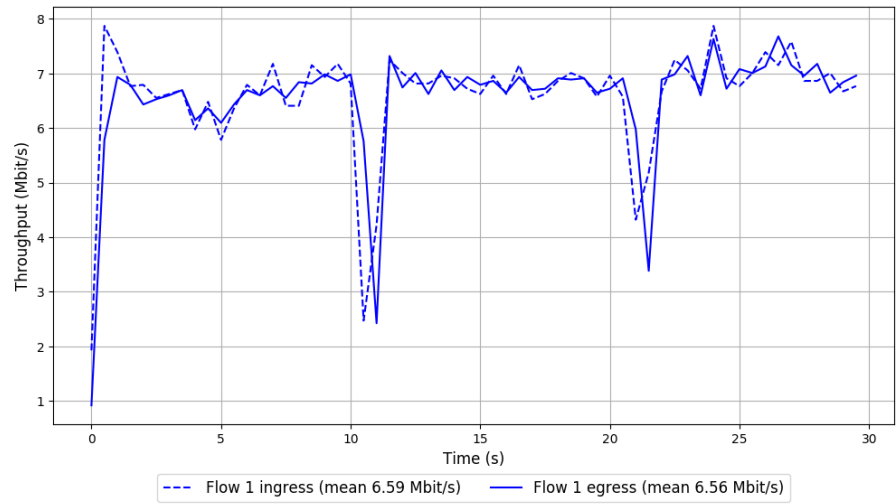test from AWS India 1 Ethernet to India ppp0, 3 runs of 30s each per scheme

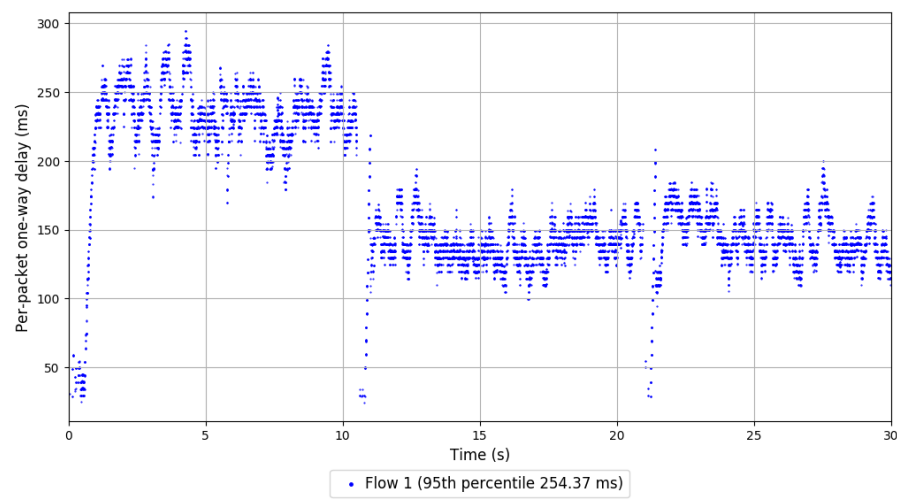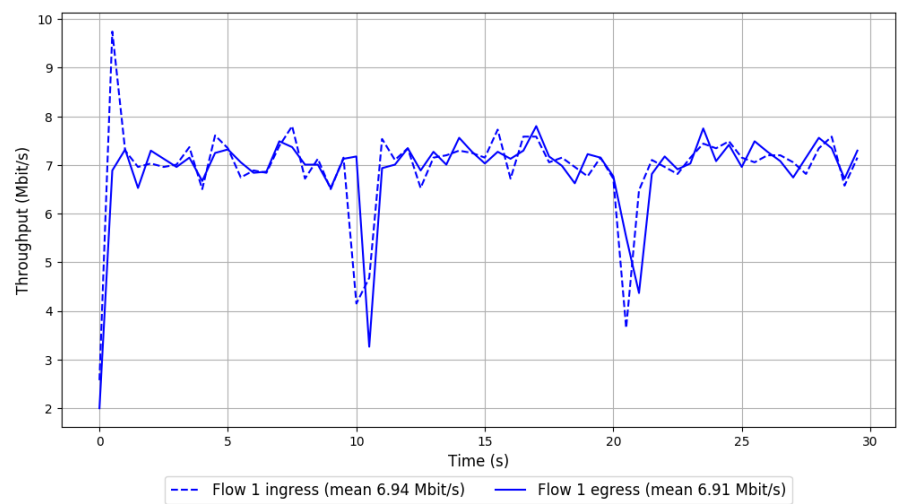| scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	6.80	263.20	0.56
TCP Cubic	3	6.19	224.65	0.61
LEDBAT	1	2.47	113.10	2.18
PCC	3	3.52	81.95	0.11
QUIC Cubic	2	6.79	248.09	0.83
SCReAM	3	0.22	43.60	0.13
WebRTC media	3	2.14	59.10	0.15
Sprout	3	1.49	59.25	0.30
TaoVA-100x	2	5.03	149.14	0.15
TCP Vegas	3	5.11	52.79	0.11
Verus	3	6.36	265.34	0.82
Copa	3	4.99	75.31	0.15
Indigo	3	2.88	44.47	0.10
Indigo-calib	3	1.23	47.66	0.04

```
Run 1: Statistics of TCP BBR

Start at: 2017-11-20 22:50:21
End at: 2017-11-20 22:50:51
Local clock offset: 11.683 ms
Remote clock offset: -12.45 ms

# Below is generated by plot.py at 2017-11-20 23:24:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.56 Mbit/s
95th percentile per-packet one-way delay: 287.145 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 6.56 Mbit/s
95th percentile per-packet one-way delay: 287.145 ms
Loss rate: 0.55%
```

Run 1: Report of TCP BBR — Data Link

Flow 1 ingress (mean 6.59 Mbit/s)   Flow 1 egress (mean 6.56 Mbit/s)

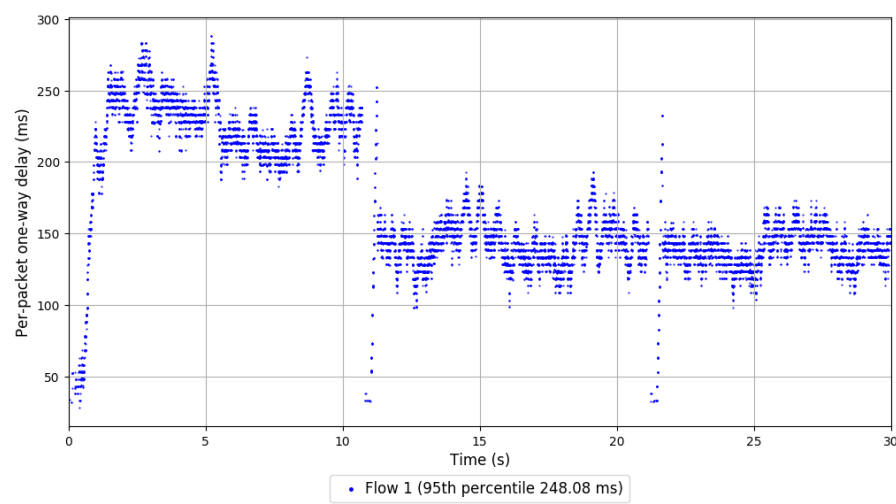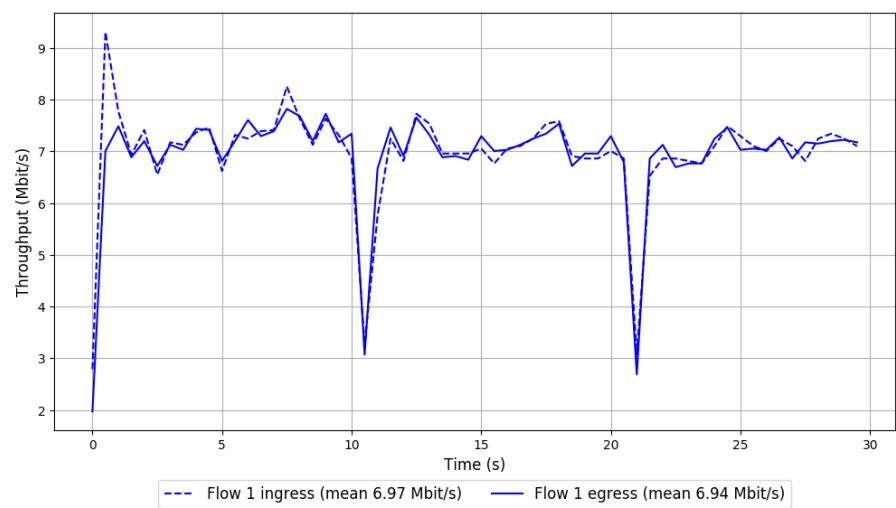• Flow 1 (95th percentile 287.14 ms)

```
Run 2: Statistics of TCP BBR

Start at: 2017-11-20 23:06:43
End at: 2017-11-20 23:07:13
Local clock offset: 13.108 ms
Remote clock offset: -14.173 ms


# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 254.371 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 254.371 ms
Loss rate: 0.55%
```
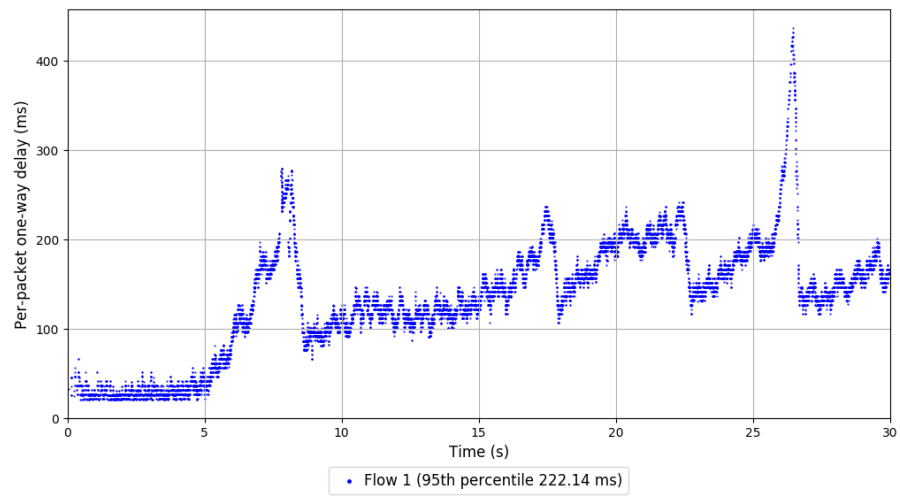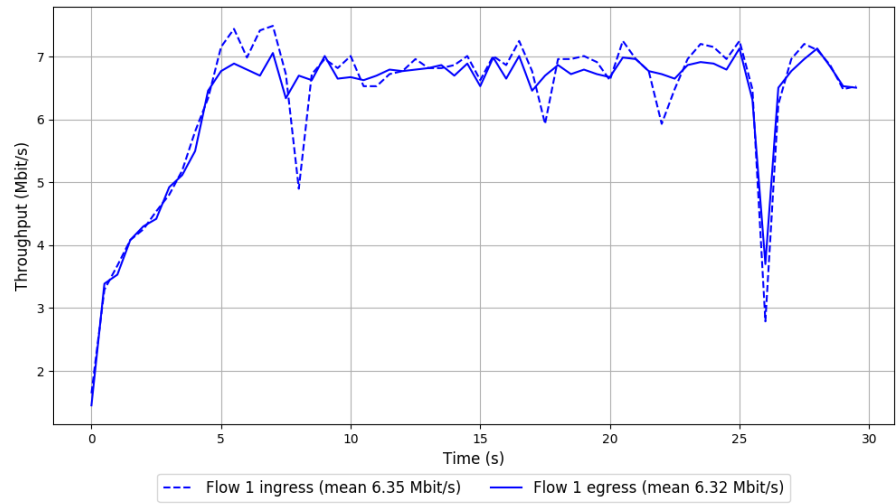
Run 2: Report of TCP BBR — Data Link

Flow 1 ingress (mean 6.94 Mbit/s)   Flow 1 egress (mean 6.91 Mbit/s)

• Flow 1 (95th percentile 254.37 ms)

```
Run 3: Statistics of TCP BBR

Start at: 2017-11-20 23:23:11
End at: 2017-11-20 23:23:41
Local clock offset: 11.068 ms
Remote clock offset: -14.418 ms


# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.94 Mbit/s
95th percentile per-packet one-way delay: 248.076 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 6.94 Mbit/s
95th percentile per-packet one-way delay: 248.076 ms
Loss rate: 0.59%
```
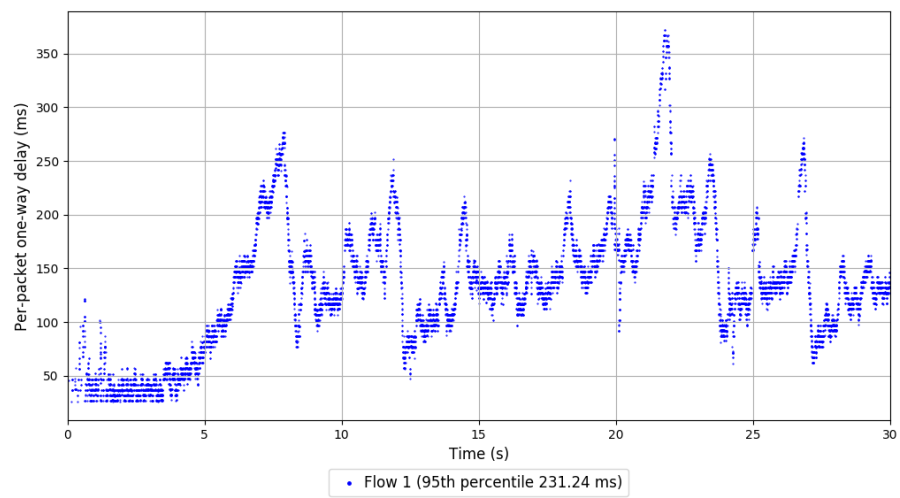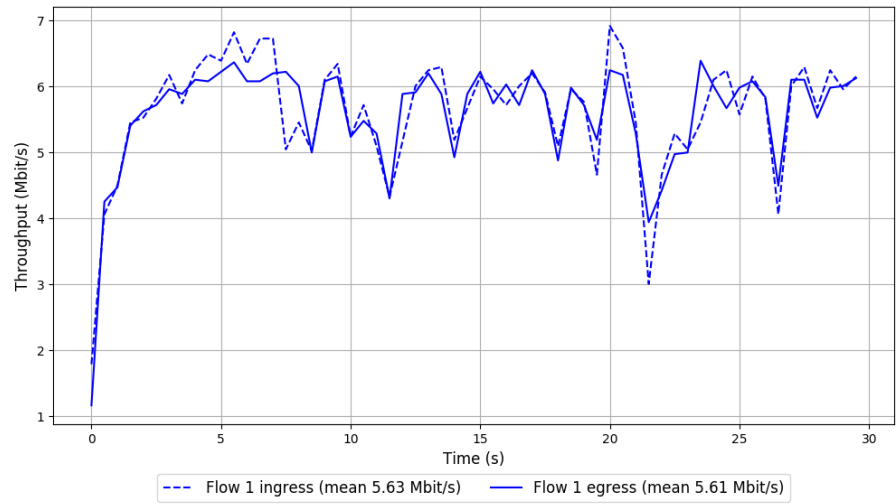
Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 6.97 Mbit/s) --- Flow 1 egress (mean 6.94 Mbit/s)

Flow 1 (95th percentile 248.08 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2017-11-20 22:39:45
End at: 2017-11-20 22:40:15
Local clock offset: 11.926 ms
Remote clock offset: -14.085 ms

# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.32 Mbit/s
95th percentile per-packet one-way delay: 222.141 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 6.32 Mbit/s
95th percentile per-packet one-way delay: 222.141 ms
Loss rate: 0.63%
```
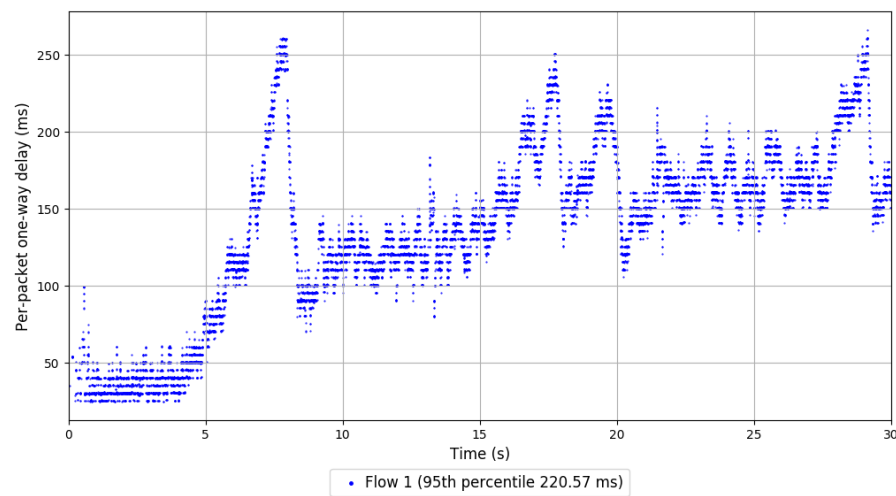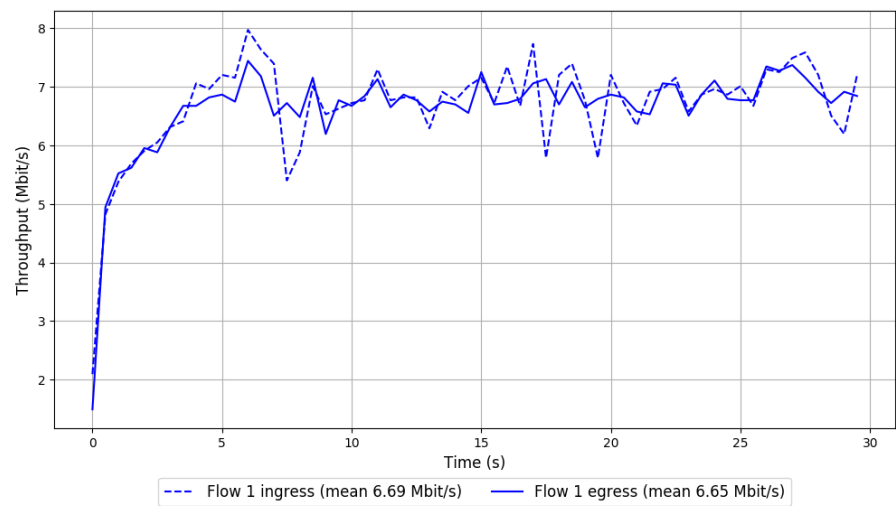
Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2017-11-20 22:56:08
End at: 2017-11-20 22:56:38
Local clock offset: 9.7 ms
Remote clock offset: -12.296 ms


# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.61 Mbit/s
95th percentile per-packet one-way delay: 231.235 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 5.61 Mbit/s
95th percentile per-packet one-way delay: 231.235 ms
Loss rate: 0.53%
```

Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-11-20 23:12:35
End at: 2017-11-20 23:13:05
Local clock offset: 10.465 ms
Remote clock offset: -13.023 ms


# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.65 Mbit/s
95th percentile per-packet one-way delay: 220.566 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 6.65 Mbit/s
95th percentile per-packet one-way delay: 220.566 ms
Loss rate: 0.66%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 6.69 Mbit/s)   Flow 1 egress (mean 6.65 Mbit/s)

Flow 1 (95th percentile 220.57 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2017-11-20 22:49:07
End at: 2017-11-20 22:49:37
Local clock offset: 12.505 ms
Remote clock offset: -13.051 ms
```
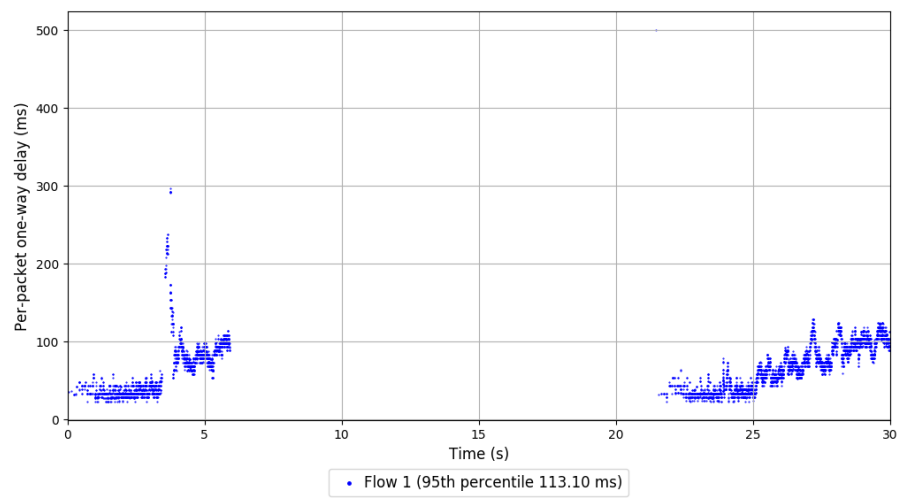
Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2017-11-20 23:05:34
End at: 2017-11-20 23:06:04
Local clock offset: 10.83 ms
Remote clock offset: -12.544 ms

# Below is generated by plot.py at 2017-11-20 23:24:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 113.102 ms
Loss rate: 2.18%
-- Flow 1:
Average throughput: 2.47 Mbit/s
95th percentile per-packet one-way delay: 113.102 ms
Loss rate: 2.18%
```
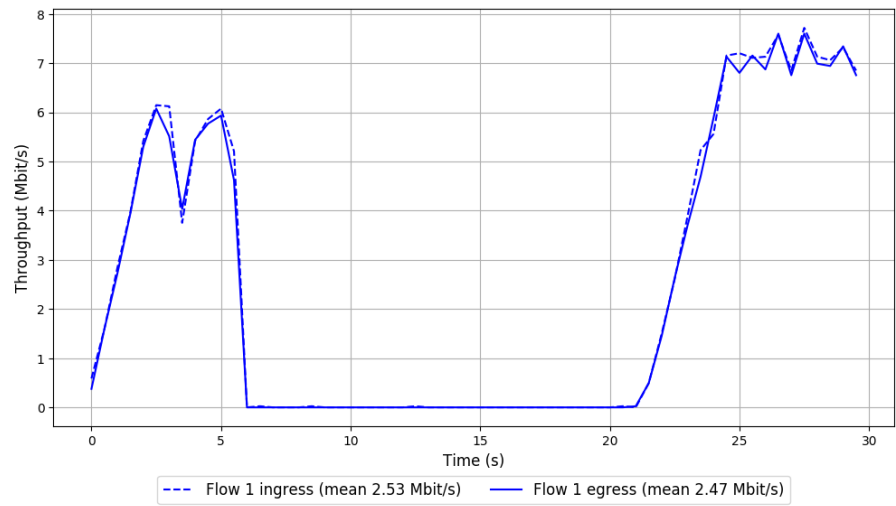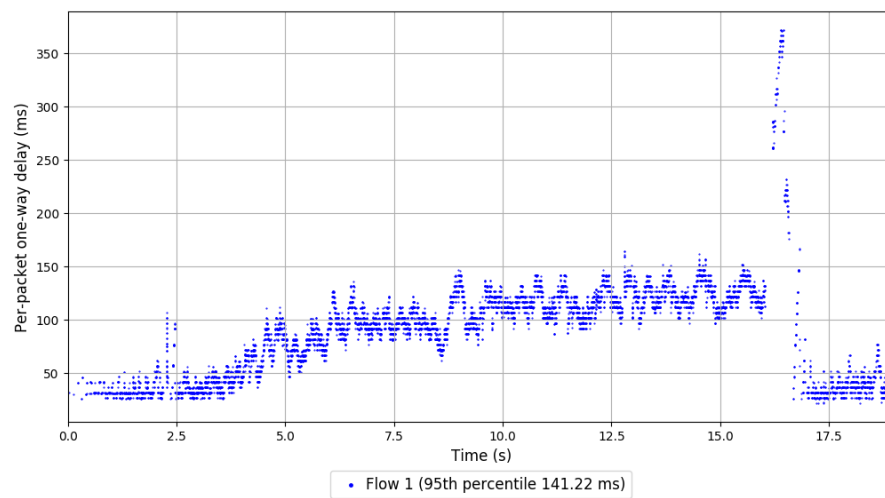
Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.53 Mbit/s) --- Flow 1 egress (mean 2.47 Mbit/s)

• Flow 1 (95th percentile 113.10 ms)

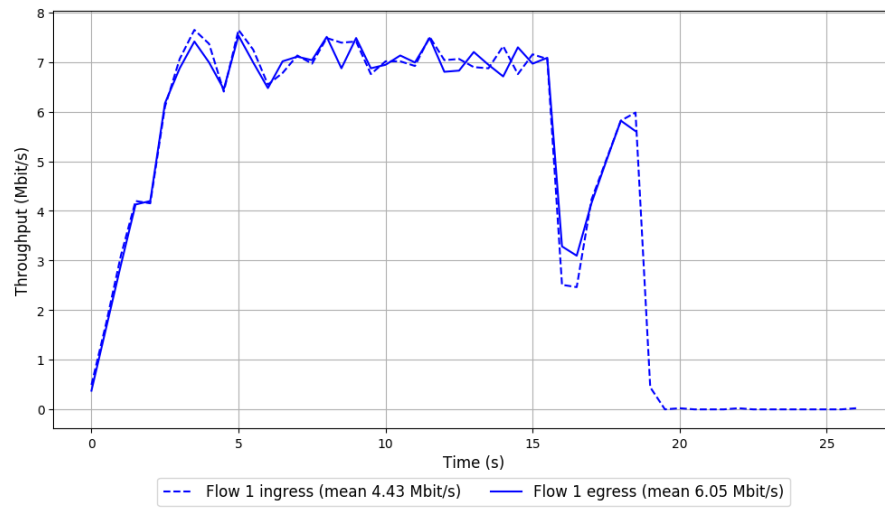```
Run 3: Statistics of LEDBAT

Start at: 2017-11-20 23:21:59
End at: 2017-11-20 23:22:29
Local clock offset: 12.89 ms
Remote clock offset: -13.445 ms
```
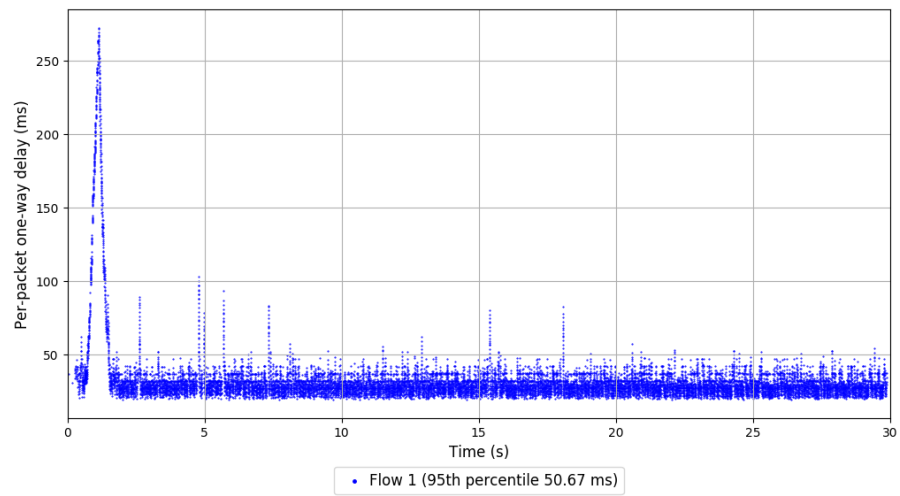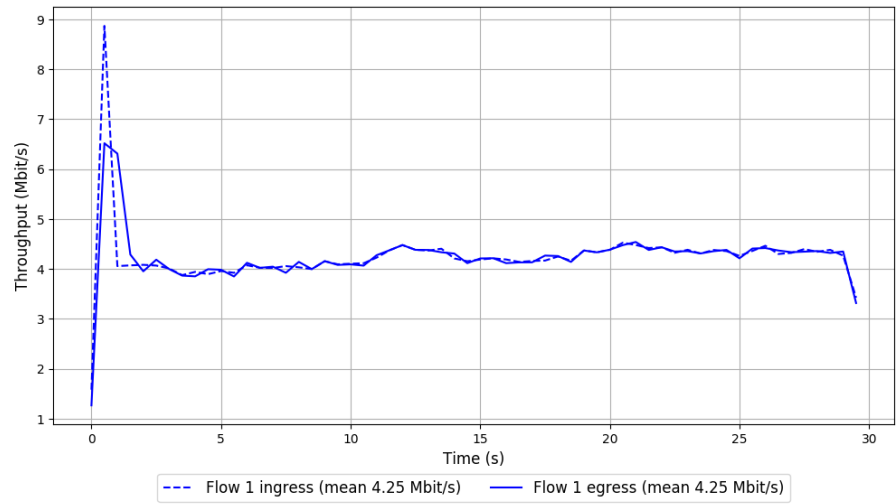
Run 3: Report of LEDBAT — Data Link



Flow 1 ingress (mean 4.43 Mbit/s)     Flow 1 egress (mean 6.05 Mbit/s)
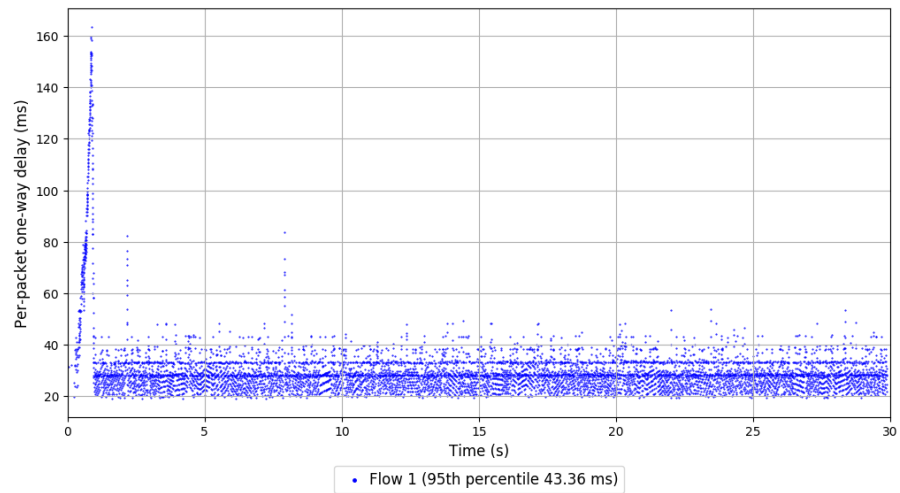


Flow 1 (95th percentile 141.22 ms)

```
Run 1: Statistics of PCC

Start at: 2017-11-20 22:37:21
End at: 2017-11-20 22:37:51
Local clock offset: 9.376 ms
Remote clock offset: -15.202 ms


# Below is generated by plot.py at 2017-11-20 23:24:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 50.667 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 50.667 ms
Loss rate: 0.14%
```

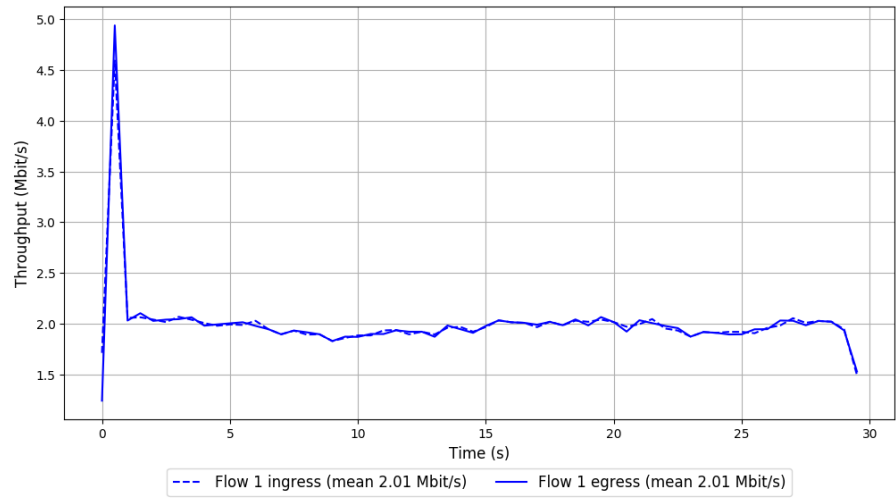# Run 1: Report of PCC — Data Link

```
Run 2: Statistics of PCC

Start at: 2017-11-20 22:53:48
End at: 2017-11-20 22:54:18
Local clock offset: 11.629 ms
Remote clock offset: -12.779 ms

# Below is generated by plot.py at 2017-11-20 23:24:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 43.361 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 43.361 ms
Loss rate: 0.08%
```

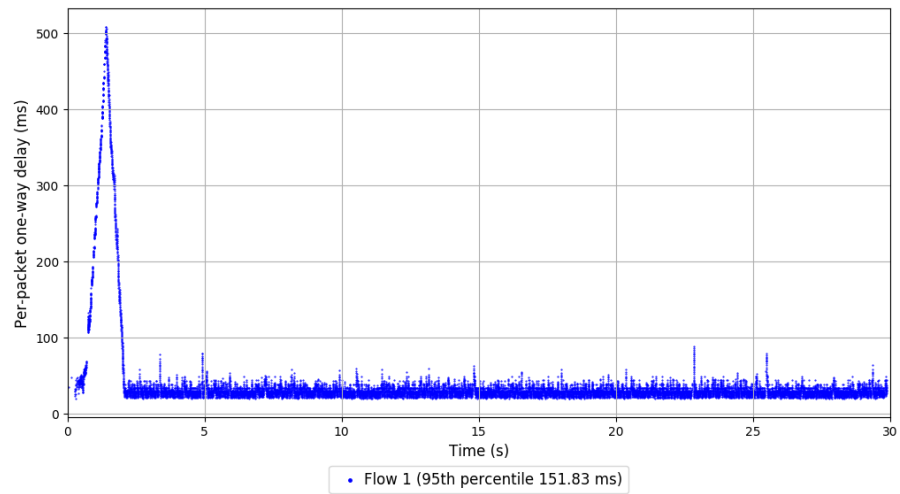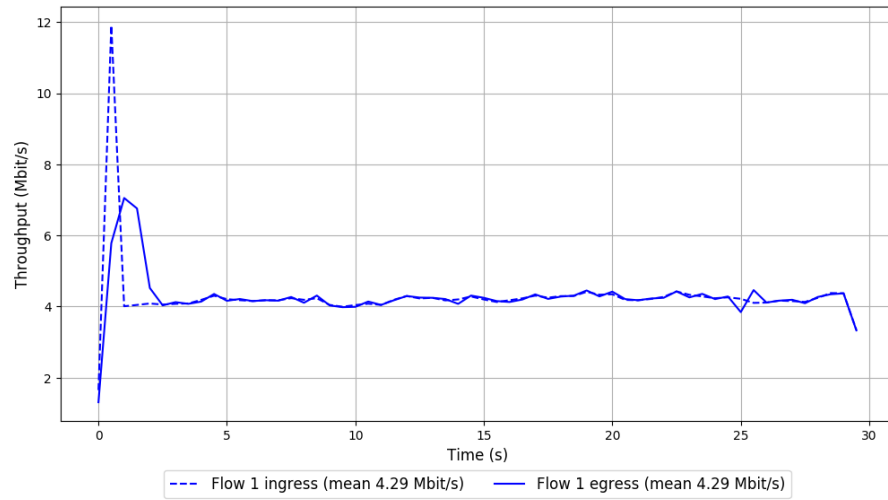# Run 2: Report of PCC — Data Link

```
Run 3: Statistics of PCC

Start at: 2017-11-20 23:10:17
End at: 2017-11-20 23:10:47
Local clock offset: 10.789 ms
Remote clock offset: -13.75 ms


# Below is generated by plot.py at 2017-11-20 23:24:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 151.830 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 151.830 ms
Loss rate: 0.11%
```

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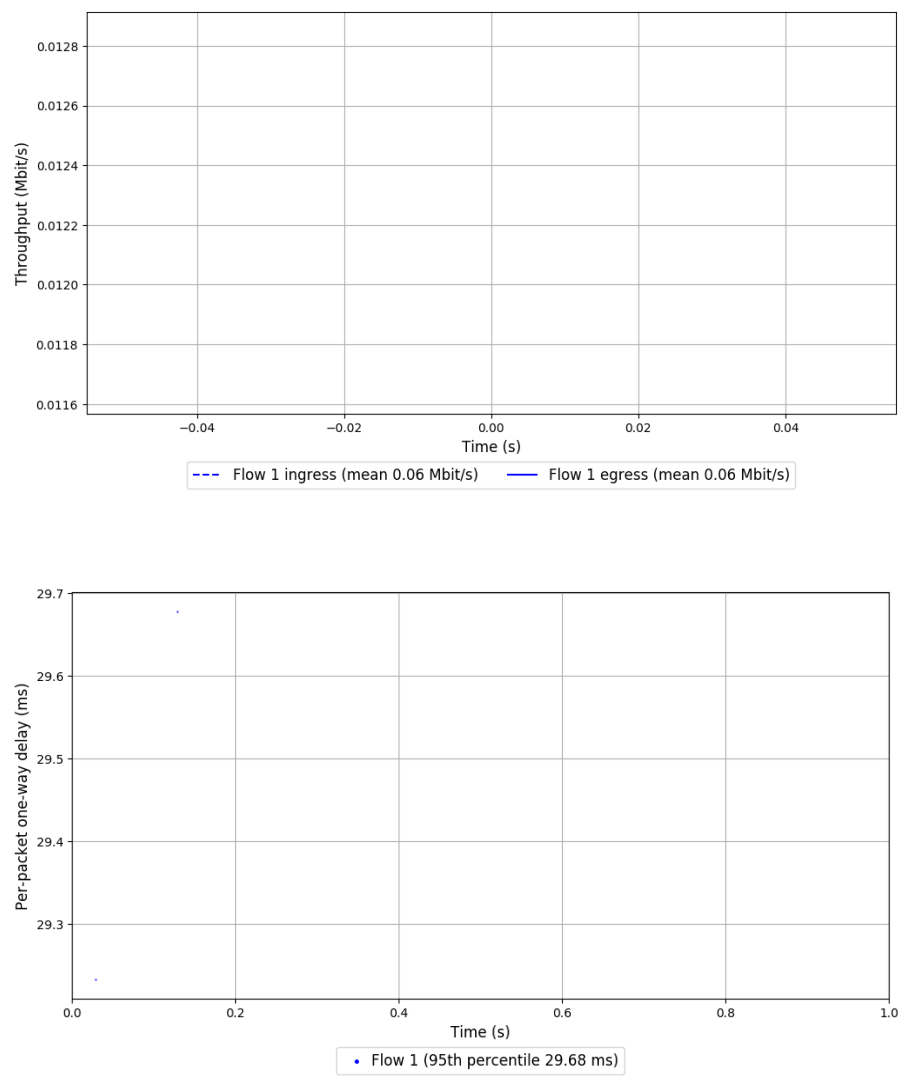
```
Run 1: Statistics of QUIC Cubic

Start at: 2017-11-20 22:46:48
End at: 2017-11-20 22:47:18
Local clock offset: 10.862 ms
Remote clock offset: -12.947 ms
```
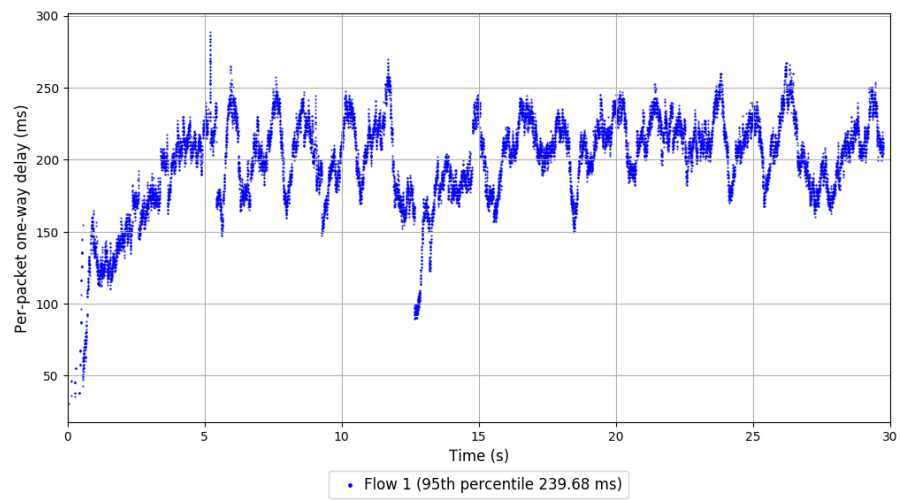
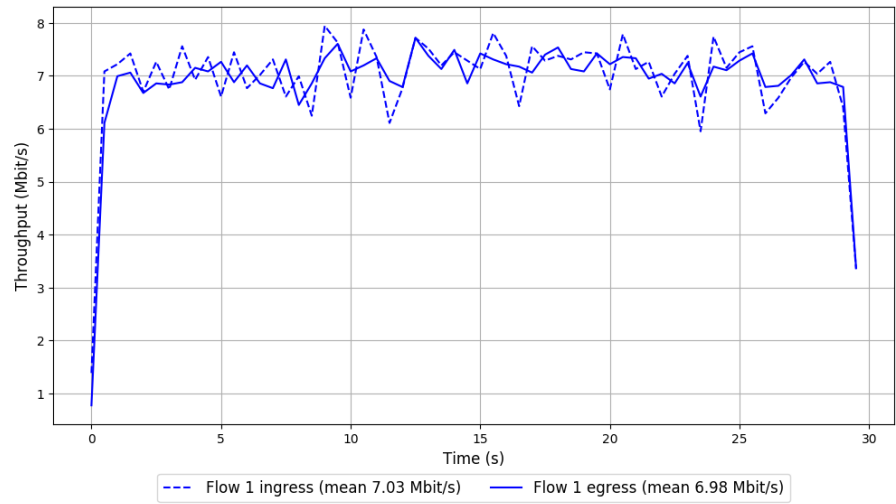# Run 1: Report of QUIC Cubic — Data Link

Throughput (Mbit/s) vs Time (s)

--- Flow 1 ingress (mean 0.06 Mbit/s)   —— Flow 1 egress (mean 0.06 Mbit/s)

Per-packet one-way delay (ms) vs Time (s)

• Flow 1 (95th percentile 29.68 ms)

```
Run 2: Statistics of QUIC Cubic

Start at: 2017-11-20 23:03:16
End at: 2017-11-20 23:03:46
Local clock offset: 11.862 ms
Remote clock offset: -11.369 ms


# Below is generated by plot.py at 2017-11-20 23:25:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.98 Mbit/s
95th percentile per-packet one-way delay: 239.679 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 6.98 Mbit/s
95th percentile per-packet one-way delay: 239.679 ms
Loss rate: 0.76%
```

Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 7.03 Mbit/s) ——— Flow 1 egress (mean 6.98 Mbit/s)

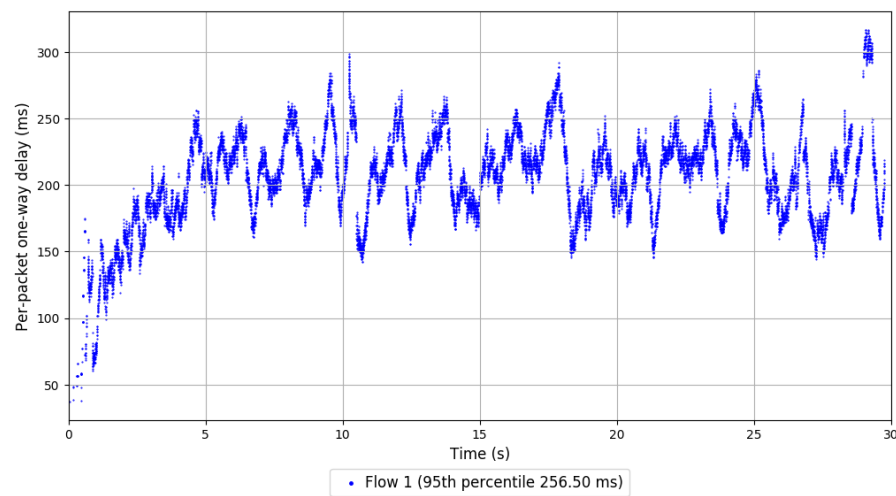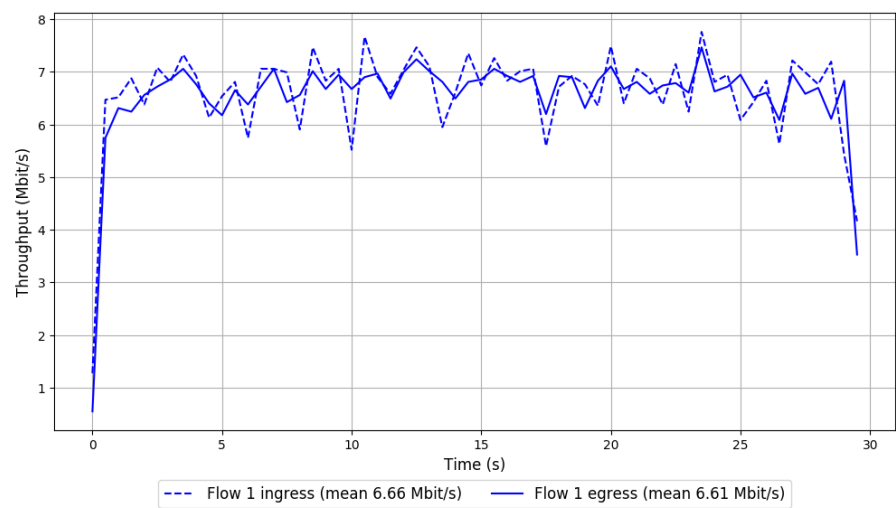

• Flow 1 (95th percentile 239.68 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-11-20 23:19:37
End at: 2017-11-20 23:20:07
Local clock offset: 10.191 ms
Remote clock offset: -13.433 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.61 Mbit/s
95th percentile per-packet one-way delay: 256.504 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 6.61 Mbit/s
95th percentile per-packet one-way delay: 256.504 ms
Loss rate: 0.91%
```
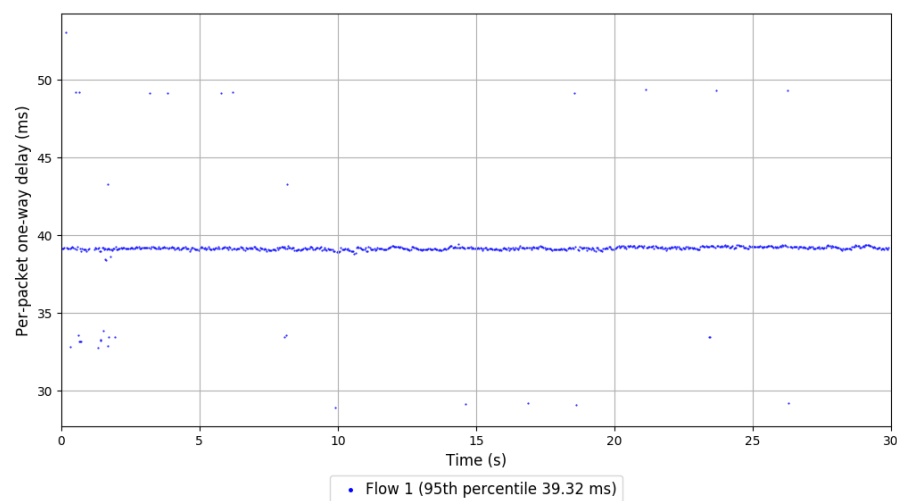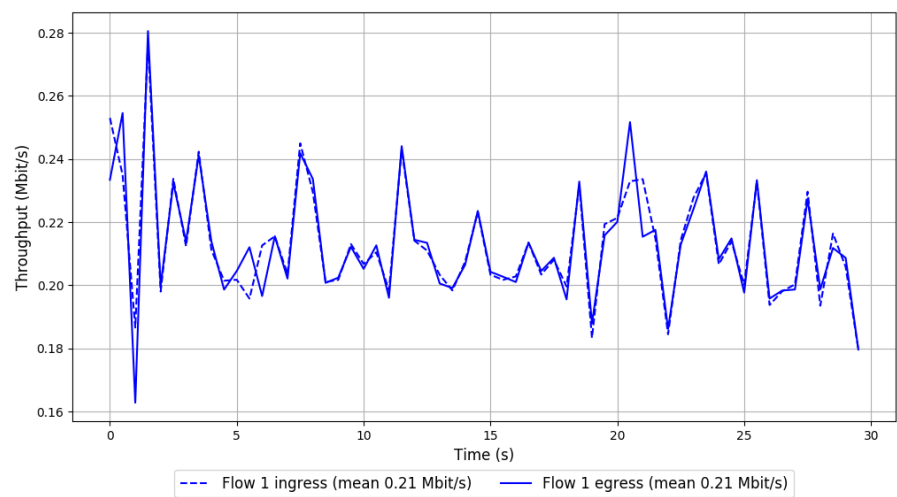
Run 3: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2017-11-20 22:44:23
End at: 2017-11-20 22:44:54
Local clock offset: 11.945 ms
Remote clock offset: -13.671 ms

# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 39.319 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 39.319 ms
Loss rate: 0.13%
```

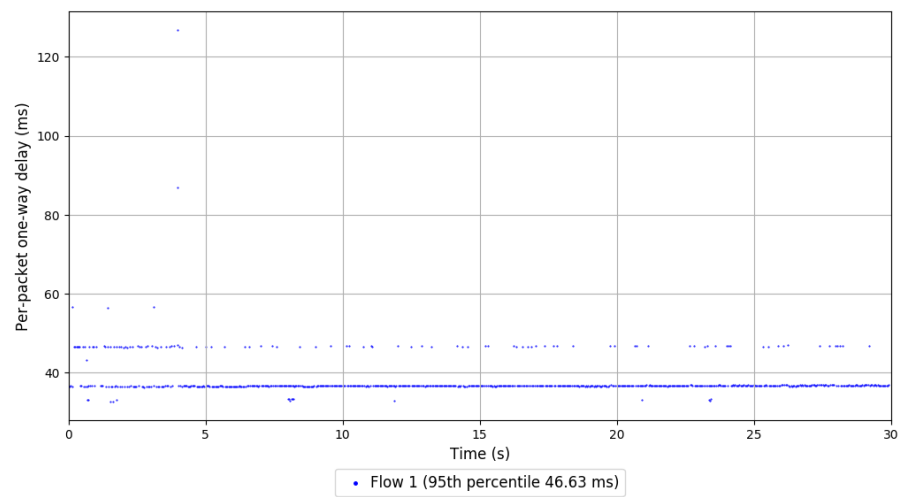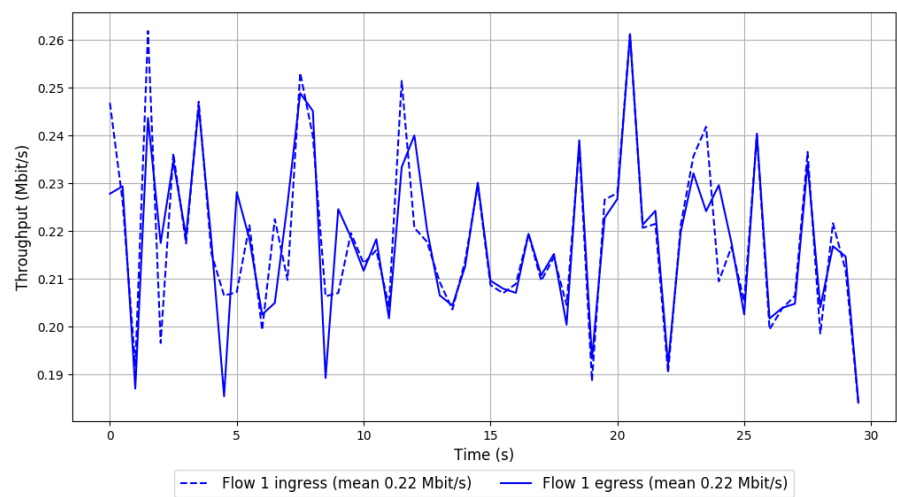# Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2017-11-20 23:01:00
End at: 2017-11-20 23:01:30
Local clock offset: 10.014 ms
Remote clock offset: -11.546 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.632 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 46.632 ms
Loss rate: 0.13%
```

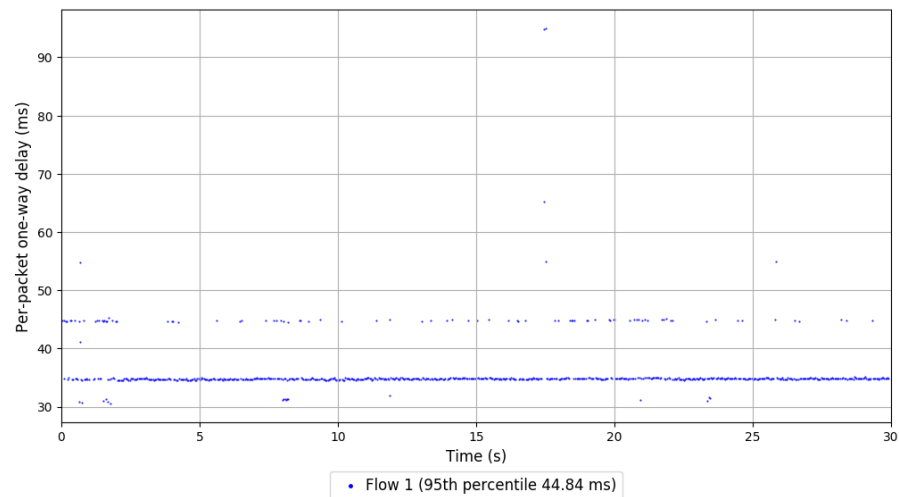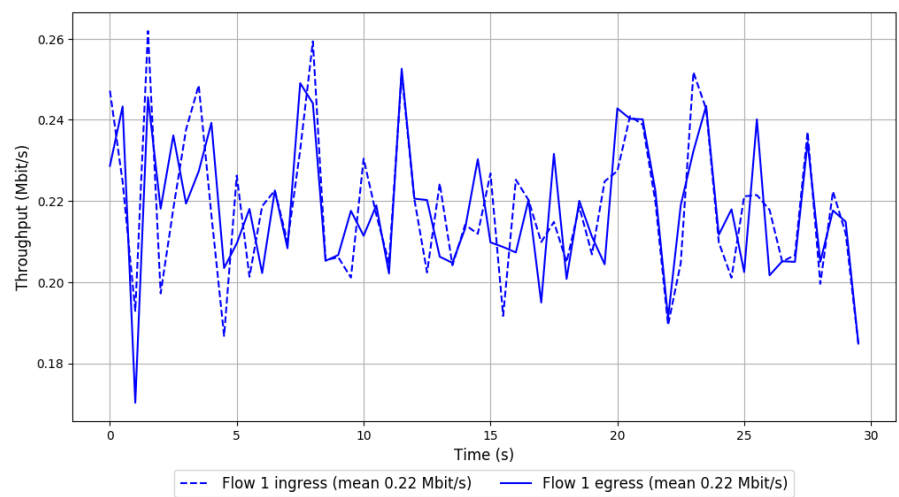Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2017-11-20 23:17:16
End at: 2017-11-20 23:17:46
Local clock offset: 10.748 ms
Remote clock offset: -13.238 ms

# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 44.841 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 44.841 ms
Loss rate: 0.13%
```

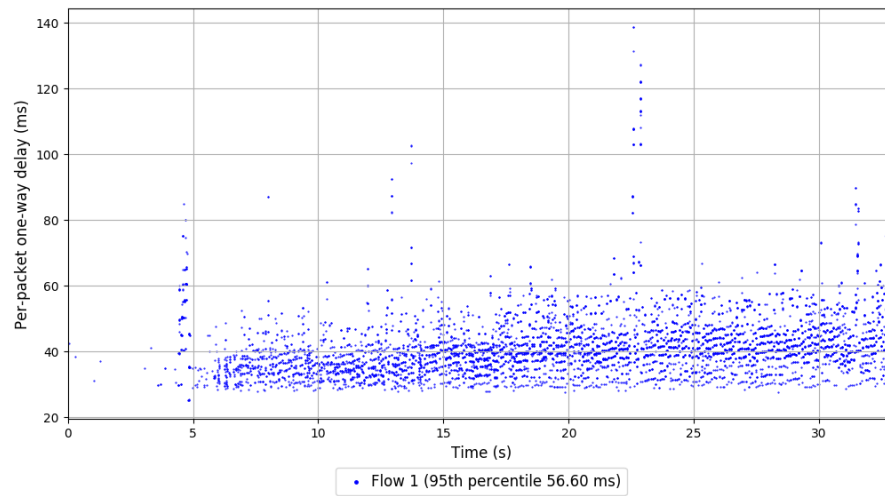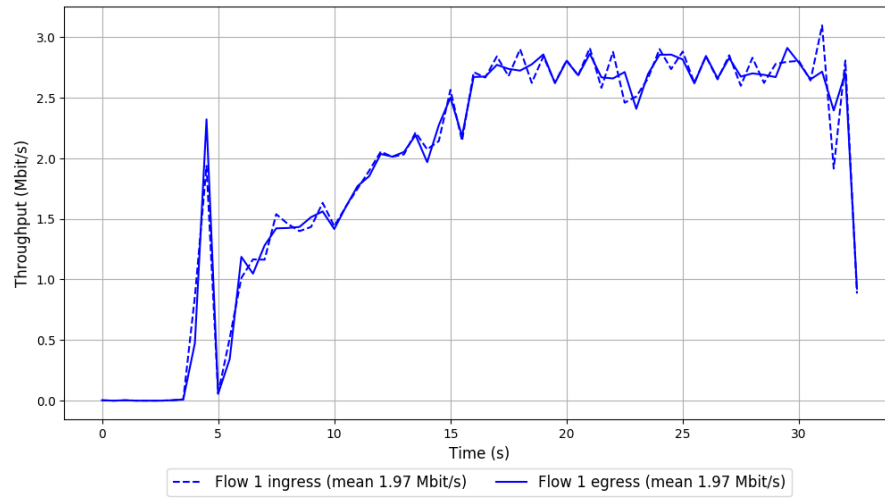# Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2017-11-20 22:38:33
End at: 2017-11-20 22:39:03
Local clock offset: 9.644 ms
Remote clock offset: -13.118 ms

# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 56.600 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 56.600 ms
Loss rate: 0.14%
```

Run 1: Report of WebRTC media — Data Link

Flow 1 ingress (mean 1.97 Mbit/s)   Flow 1 egress (mean 1.97 Mbit/s)

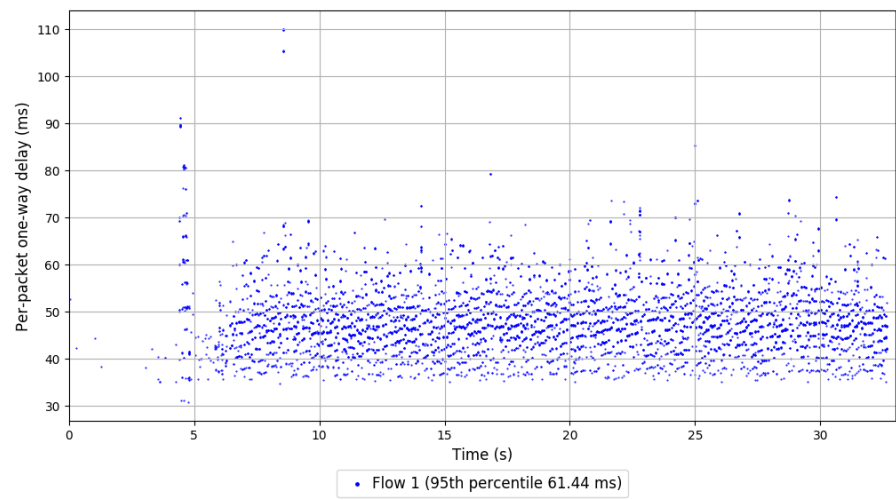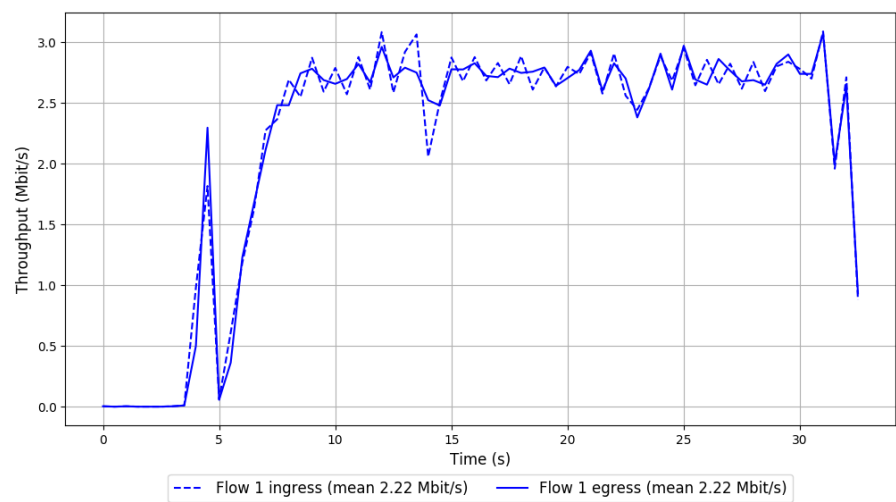Flow 1 (95th percentile 56.60 ms)

```
Run 2: Statistics of WebRTC media

Start at: 2017-11-20 22:54:58
End at: 2017-11-20 22:55:28
Local clock offset: 10.054 ms
Remote clock offset: -11.19 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 61.437 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 61.437 ms
Loss rate: 0.16%
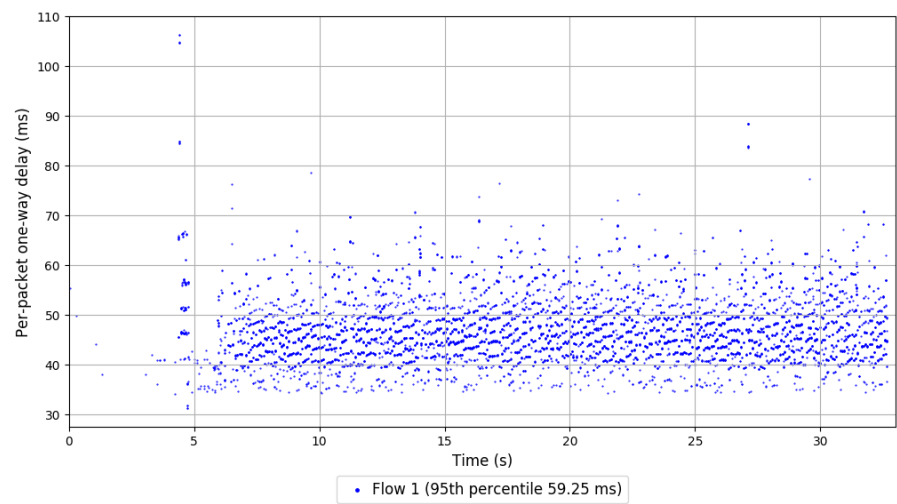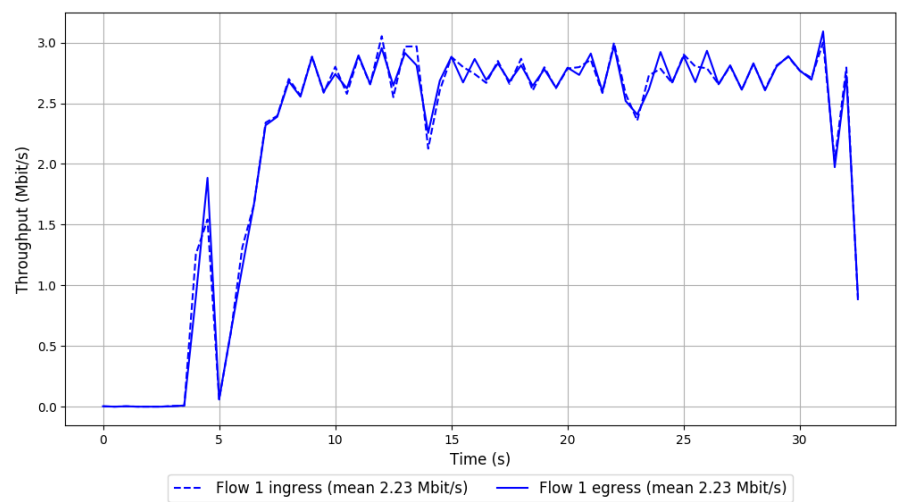```

Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2017-11-20 23:11:25
End at: 2017-11-20 23:11:55
Local clock offset: 10.018 ms
Remote clock offset: -12.81 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 59.249 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 59.249 ms
Loss rate: 0.16%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 2.23 Mbit/s)   Flow 1 egress (mean 2.23 Mbit/s)

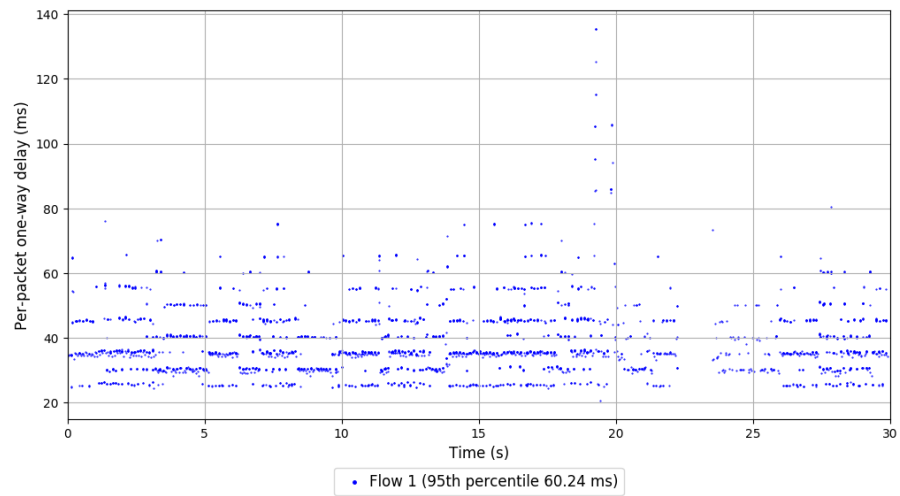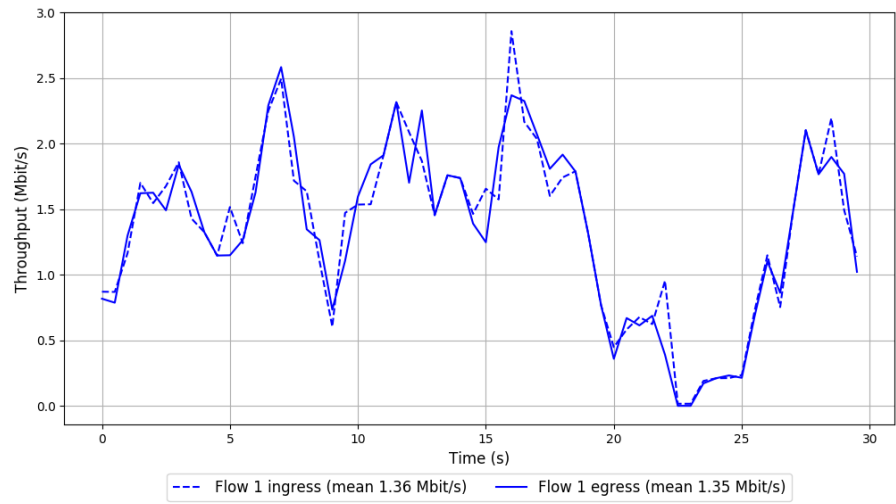

Flow 1 (95th percentile 59.25 ms)

```
Run 1: Statistics of Sprout

Start at: 2017-11-20 22:42:06
End at: 2017-11-20 22:42:36
Local clock offset: 8.424 ms
Remote clock offset: -14.477 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 60.241 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 60.241 ms
Loss rate: 0.90%
```

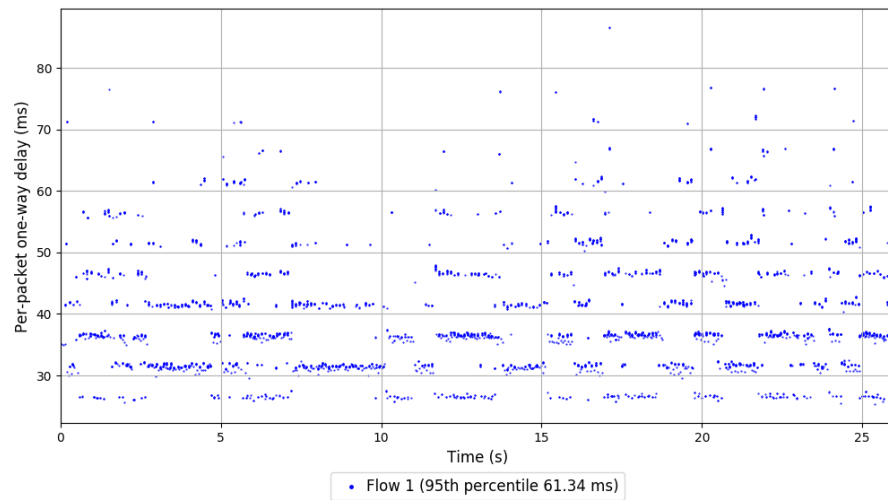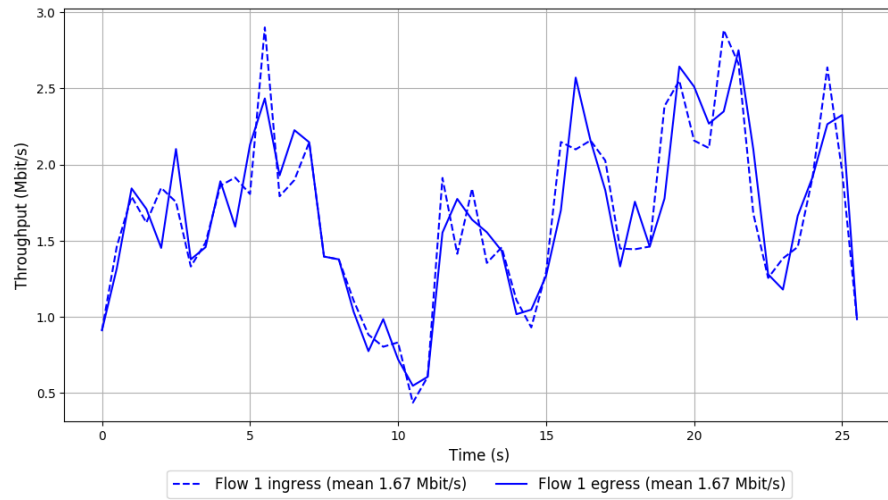Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-11-20 22:58:31
End at: 2017-11-20 22:59:01
Local clock offset: 9.179 ms
Remote clock offset: -12.782 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 61.341 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 61.341 ms
Loss rate: 0.00%
```

Run 2: Report of Sprout — Data Link

Flow 1 ingress (mean 1.67 Mbit/s) --- Flow 1 egress (mean 1.67 Mbit/s)

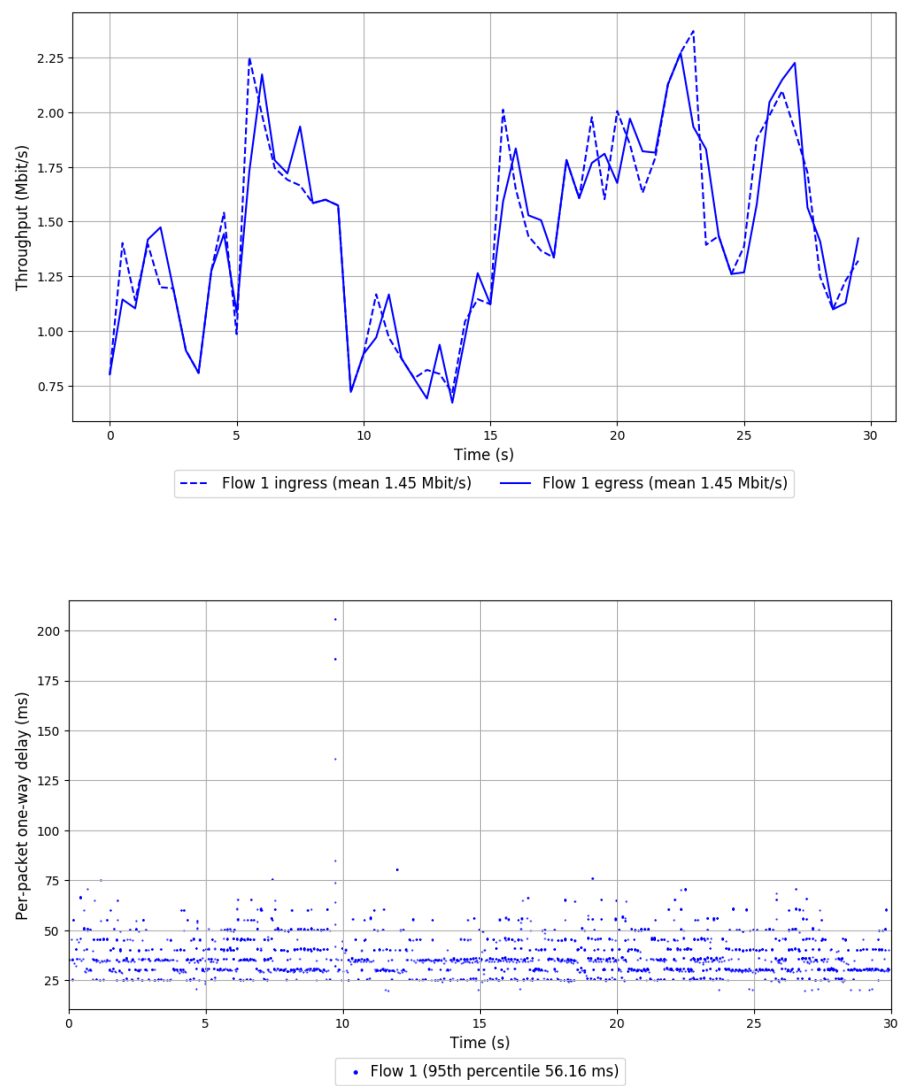Flow 1 (95th percentile 61.34 ms)

49

```
Run 3: Statistics of Sprout

Start at: 2017-11-20 23:14:57
End at: 2017-11-20 23:15:27
Local clock offset: 12.142 ms
Remote clock offset: -12.734 ms


# Below is generated by plot.py at 2017-11-20 23:25:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 56.161 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 56.161 ms
Loss rate: 0.00%
```

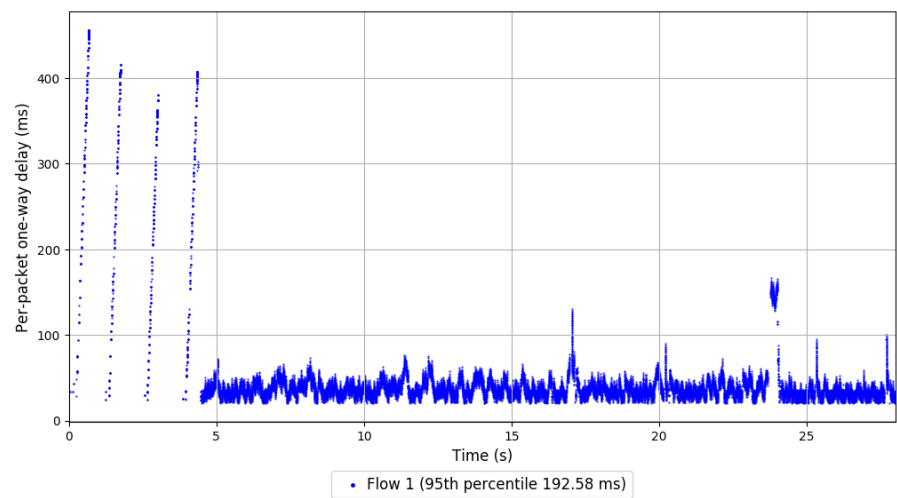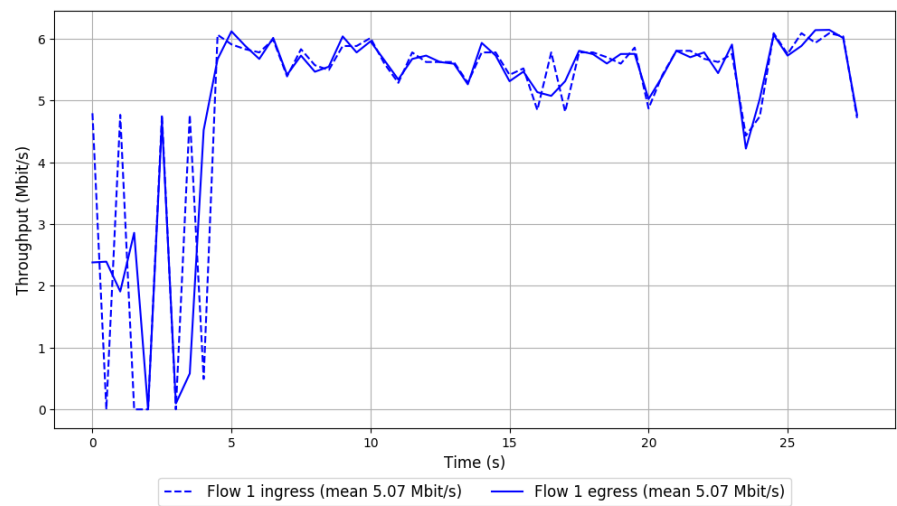Run 3: Report of Sprout — Data Link

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

Start at: 2017-11-20 22:45:34
End at: 2017-11-20 22:46:04
Local clock offset: 9.718 ms
Remote clock offset: -13.692 ms

# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 192.582 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 192.582 ms
Loss rate: 0.10%
```

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

Flow 1 ingress (mean 5.07 Mbit/s) ----   Flow 1 egress (mean 5.07 Mbit/s) ——
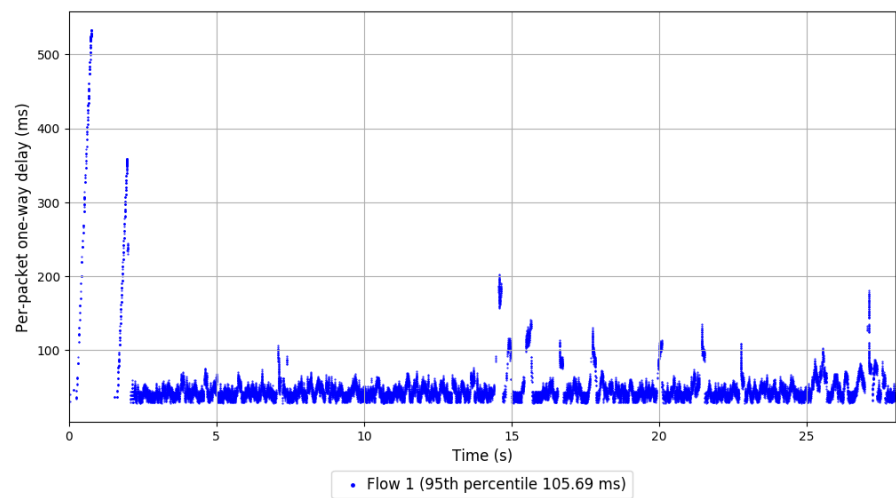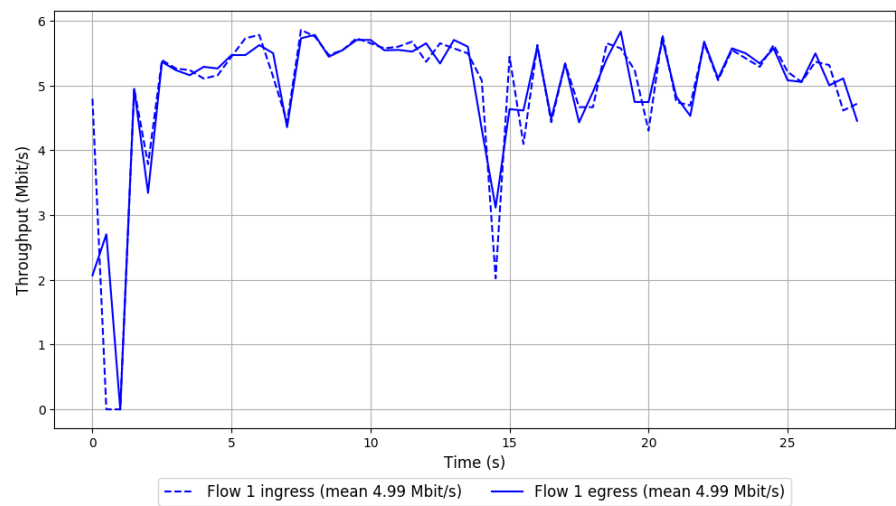

• Flow 1 (95th percentile 192.58 ms)

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

Start at: 2017-11-20 23:02:08
End at: 2017-11-20 23:02:38
Local clock offset: 11.272 ms
Remote clock offset: -12.727 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.99 Mbit/s
95th percentile per-packet one-way delay: 105.691 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 4.99 Mbit/s
95th percentile per-packet one-way delay: 105.691 ms
Loss rate: 0.21%
```

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

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

Start at: 2017-11-20 23:18:25
End at: 2017-11-20 23:18:55
Local clock offset: 11.594 ms
Remote clock offset: -14.168 ms
```
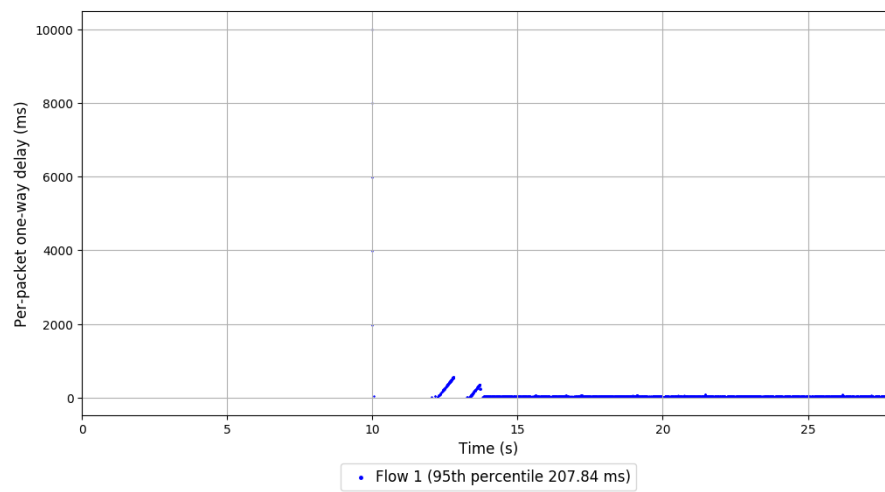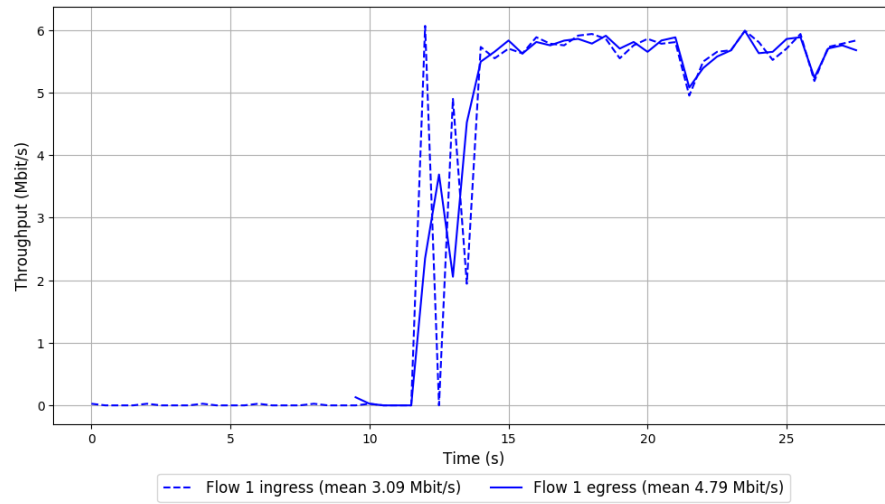
Run 3: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 3.09 Mbit/s) — — — Flow 1 egress (mean 4.79 Mbit/s)
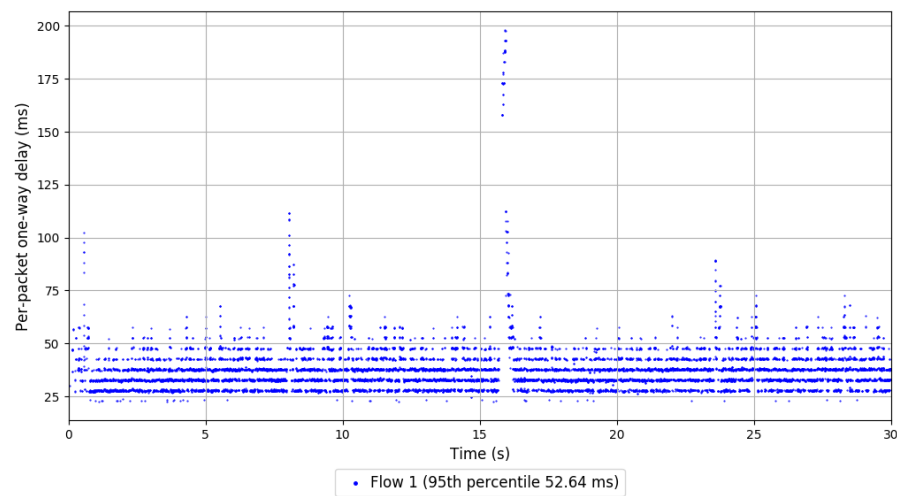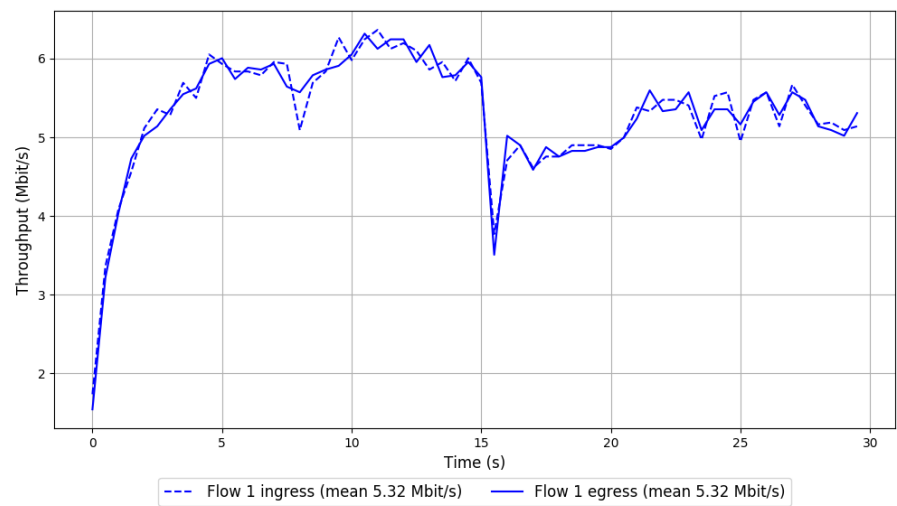

Flow 1 (95th percentile 207.84 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2017-11-20 22:43:15
End at: 2017-11-20 22:43:45
Local clock offset: 7.354 ms
Remote clock offset: -13.989 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.32 Mbit/s
95th percentile per-packet one-way delay: 52.639 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 5.32 Mbit/s
95th percentile per-packet one-way delay: 52.639 ms
Loss rate: 0.12%
```
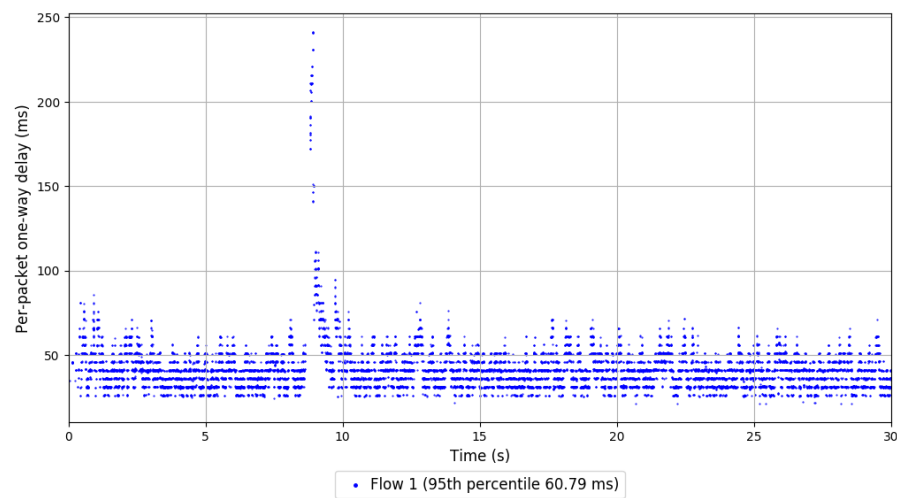
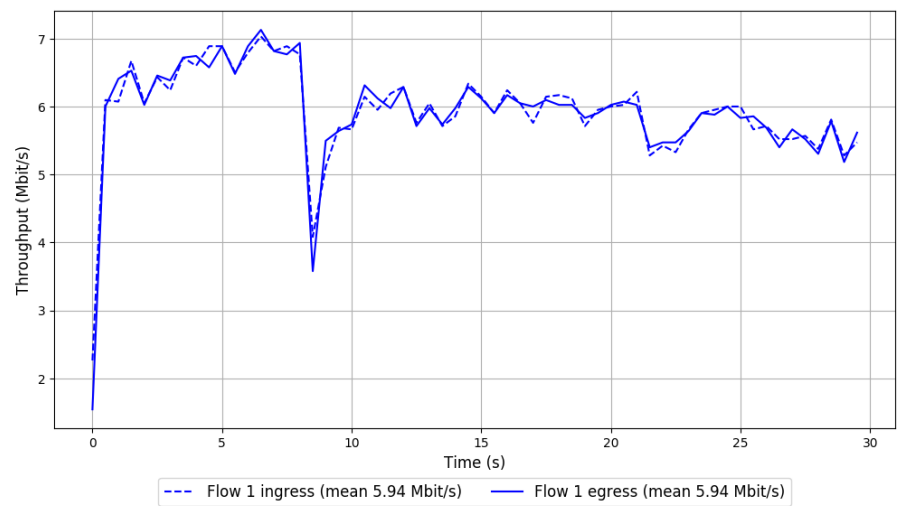Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-11-20 22:59:41
End at: 2017-11-20 23:00:11
Local clock offset: 10.776 ms
Remote clock offset: -13.042 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.94 Mbit/s
95th percentile per-packet one-way delay: 60.792 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 5.94 Mbit/s
95th percentile per-packet one-way delay: 60.792 ms
Loss rate: 0.13%
```

Run 2: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 5.94 Mbit/s) — — —   Flow 1 egress (mean 5.94 Mbit/s) ———
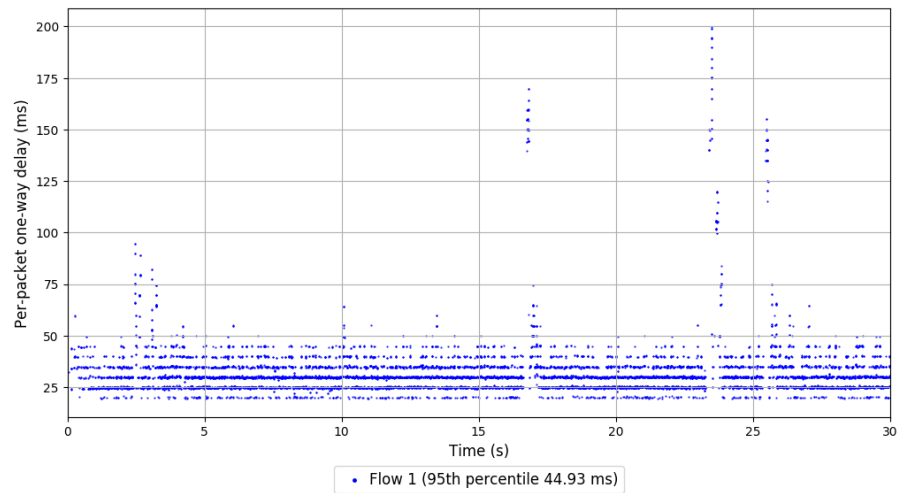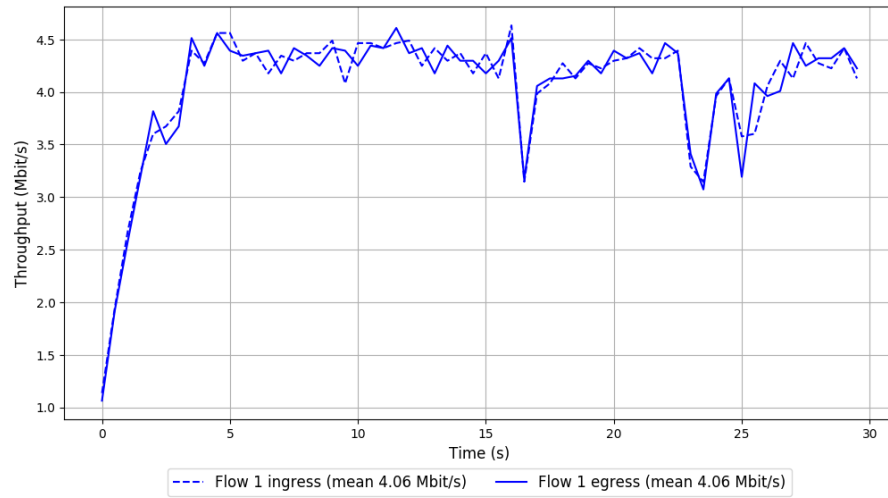

• Flow 1 (95th percentile 60.79 ms)

```
Run 3: Statistics of TCP Vegas

Start at: 2017-11-20 23:16:06
End at: 2017-11-20 23:16:36
Local clock offset: 13.104 ms
Remote clock offset: -13.394 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.06 Mbit/s
95th percentile per-packet one-way delay: 44.934 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 4.06 Mbit/s
95th percentile per-packet one-way delay: 44.934 ms
Loss rate: 0.07%
```
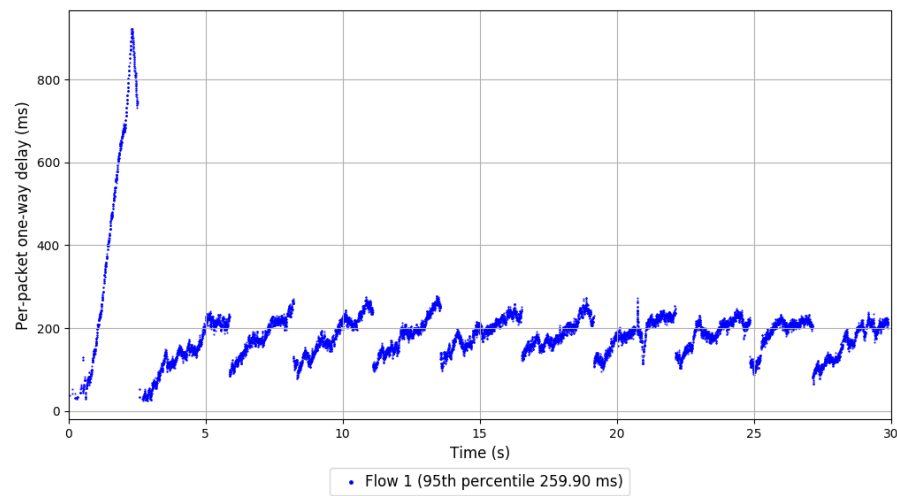
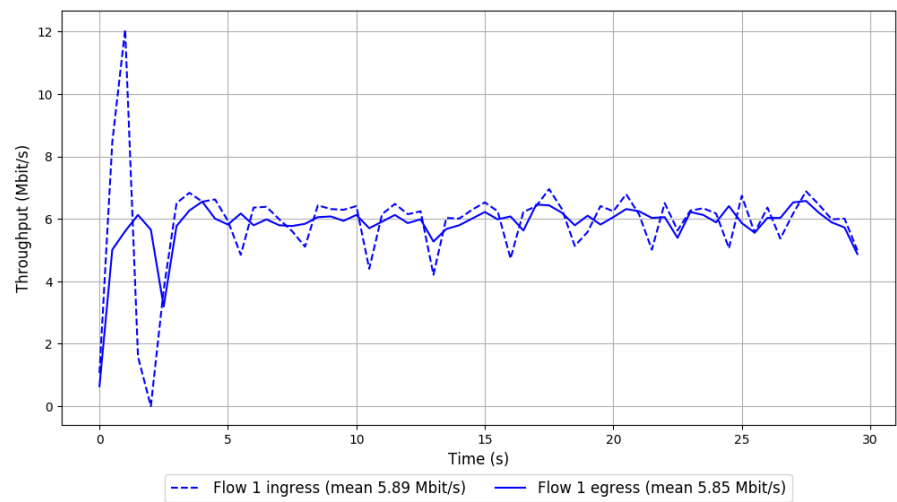Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2017-11-20 22:47:55
End at: 2017-11-20 22:48:25
Local clock offset: 7.266 ms
Remote clock offset: -13.531 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 259.902 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 259.902 ms
Loss rate: 0.86%
```

Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 5.89 Mbit/s) ---- Flow 1 egress (mean 5.85 Mbit/s) ——
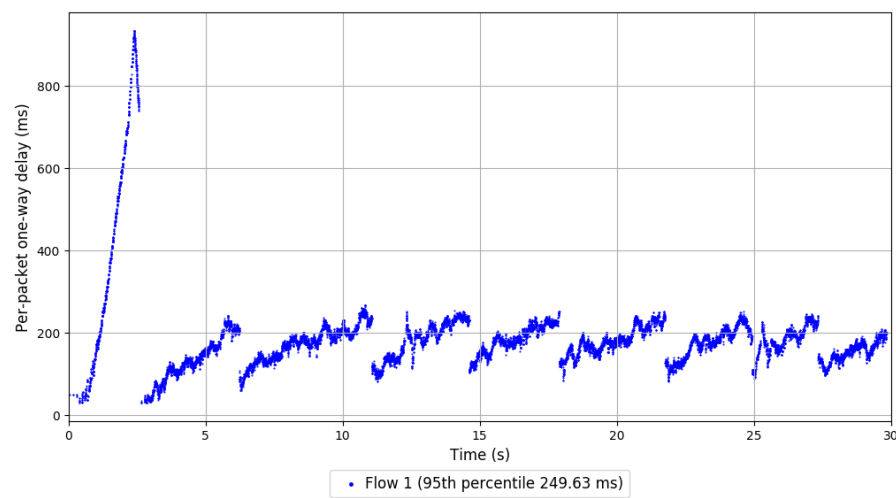

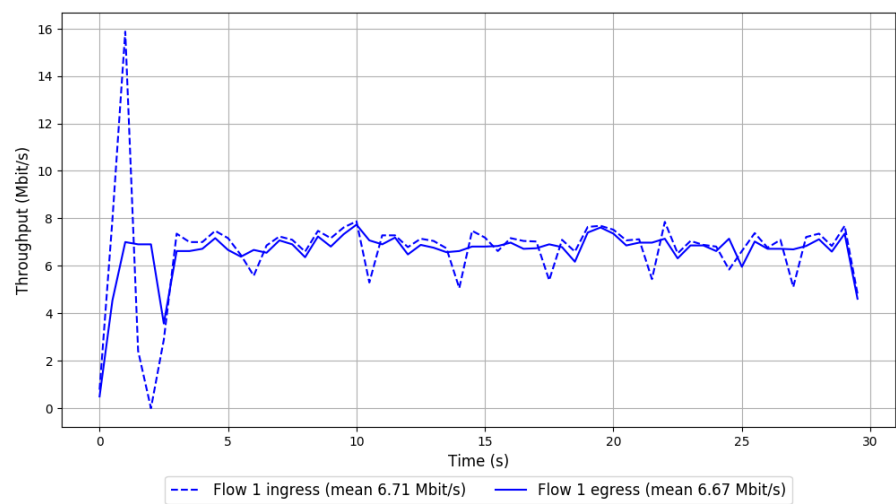
• Flow 1 (95th percentile 259.90 ms)

```
Run 2: Statistics of Verus

Start at: 2017-11-20 23:04:25
End at: 2017-11-20 23:04:55
Local clock offset: 11.864 ms
Remote clock offset: -13.25 ms


# Below is generated by plot.py at 2017-11-20 23:25:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.67 Mbit/s
95th percentile per-packet one-way delay: 249.628 ms
Loss rate: 0.79%
-- Flow 1:
Average throughput: 6.67 Mbit/s
95th percentile per-packet one-way delay: 249.628 ms
Loss rate: 0.79%
```

Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 6.71 Mbit/s)   Flow 1 egress (mean 6.67 Mbit/s)

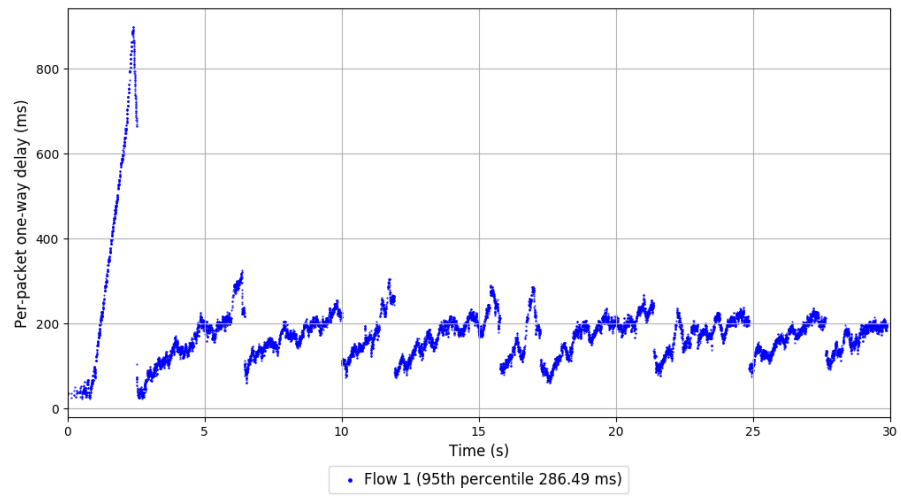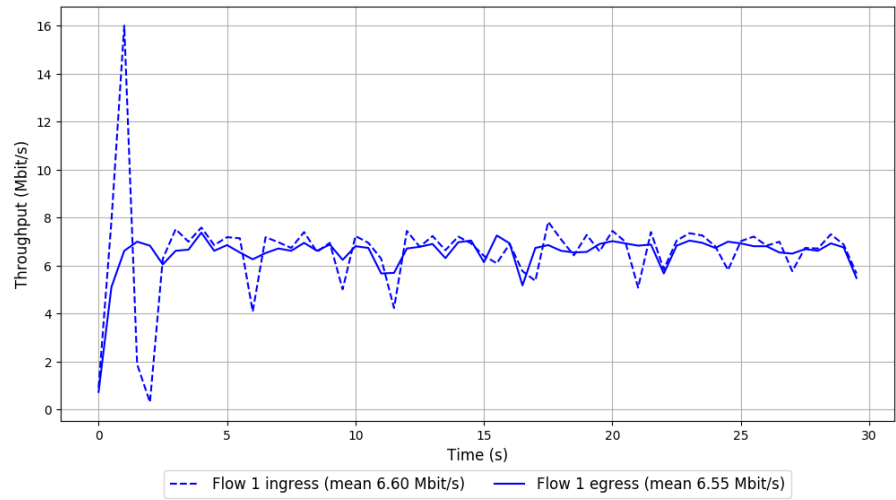Flow 1 (95th percentile 249.63 ms)

```
Run 3: Statistics of Verus

Start at: 2017-11-20 23:20:49
End at: 2017-11-20 23:21:19
Local clock offset: 10.524 ms
Remote clock offset: -14.436 ms


# Below is generated by plot.py at 2017-11-20 23:25:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.55 Mbit/s
95th percentile per-packet one-way delay: 286.492 ms
Loss rate: 0.80%
-- Flow 1:
Average throughput: 6.55 Mbit/s
95th percentile per-packet one-way delay: 286.492 ms
Loss rate: 0.80%
```
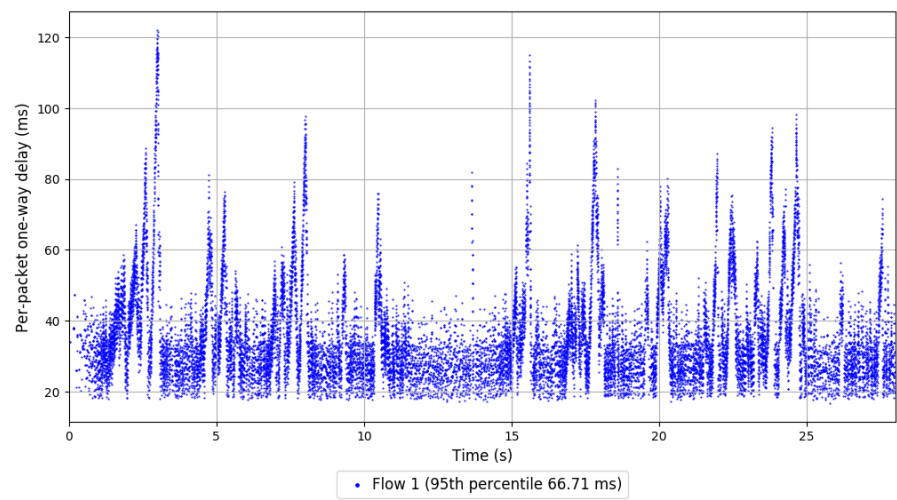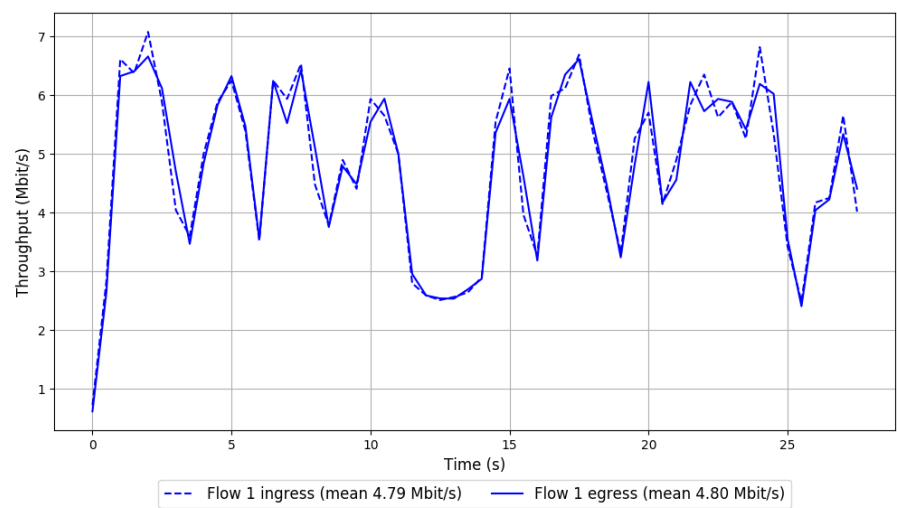
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of Copa

Start at: 2017-11-20 22:40:54
End at: 2017-11-20 22:41:24
Local clock offset: 11.533 ms
Remote clock offset: -14.903 ms

# Below is generated by plot.py at 2017-11-20 23:25:21
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.80 Mbit/s
95th percentile per-packet one-way delay: 66.712 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 4.80 Mbit/s
95th percentile per-packet one-way delay: 66.712 ms
Loss rate: 0.09%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 4.79 Mbit/s)   Flow 1 egress (mean 4.80 Mbit/s)

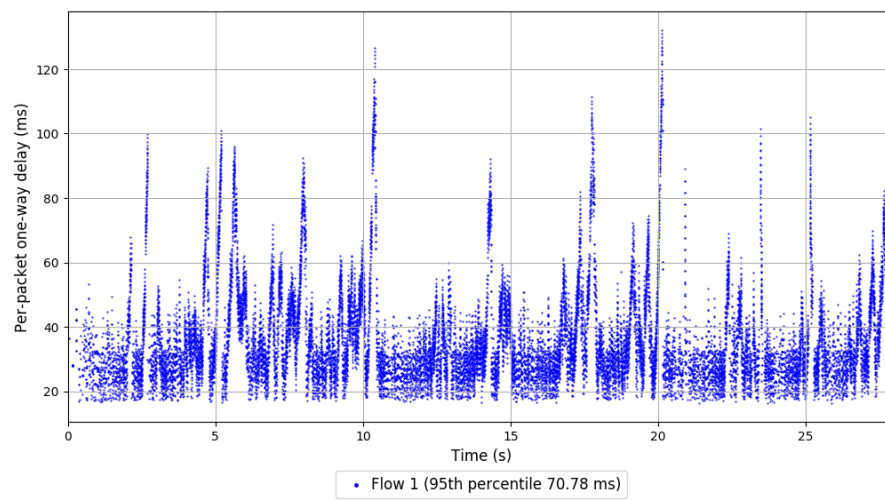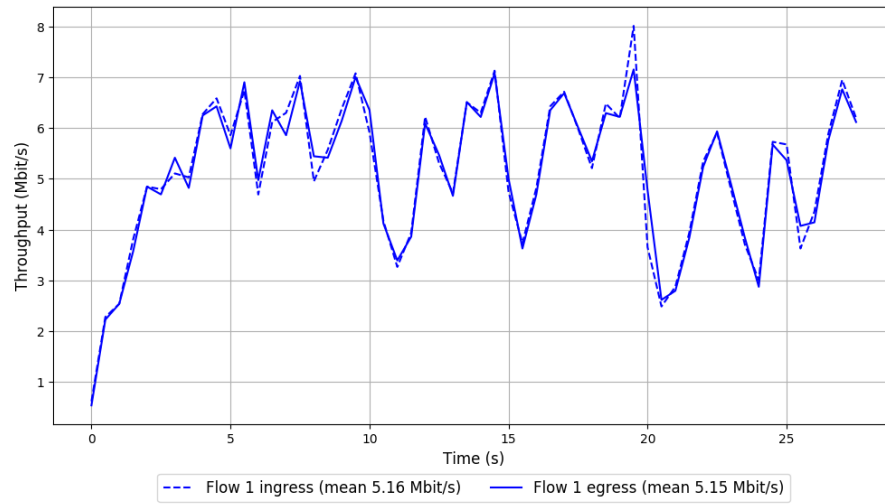Flow 1 (95th percentile 66.71 ms)

```
Run 2: Statistics of Copa

Start at: 2017-11-20 22:57:23
End at: 2017-11-20 22:57:53
Local clock offset: 8.875 ms
Remote clock offset: -18.505 ms

# Below is generated by plot.py at 2017-11-20 23:25:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.15 Mbit/s
95th percentile per-packet one-way delay: 70.782 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 5.15 Mbit/s
95th percentile per-packet one-way delay: 70.782 ms
Loss rate: 0.25%
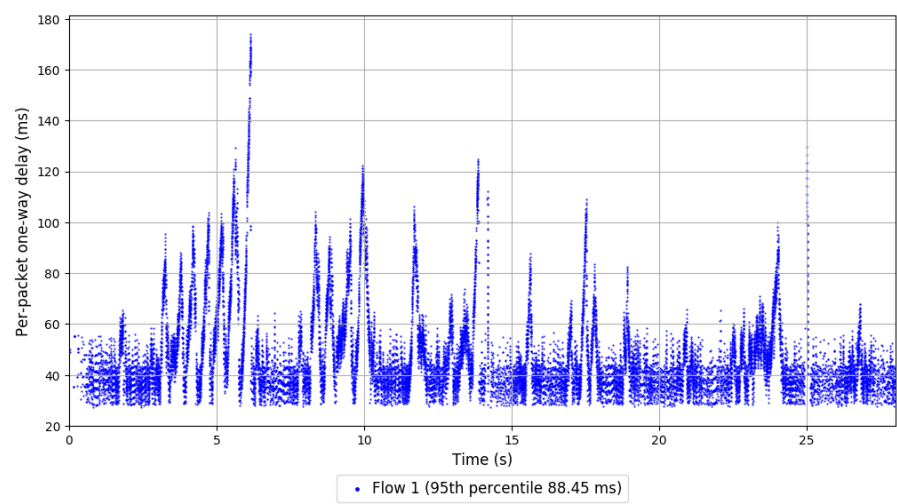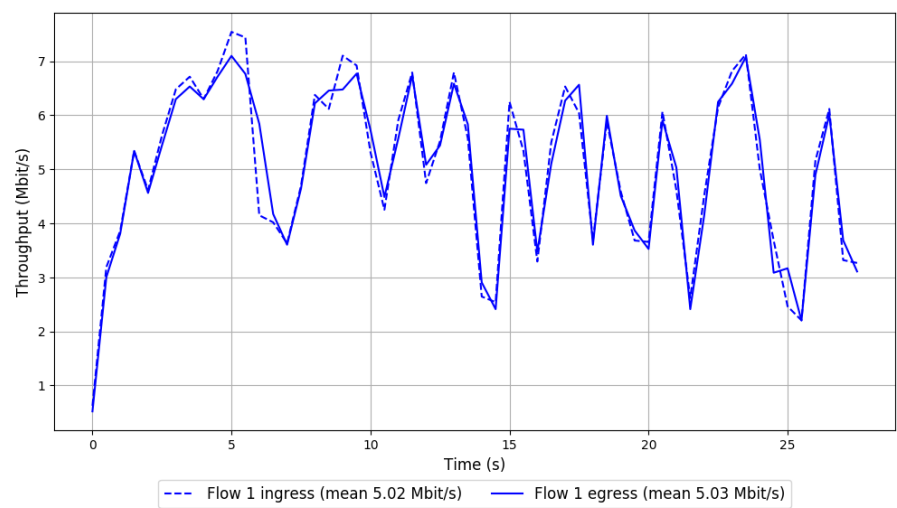```

Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2017-11-20 23:13:46
End at: 2017-11-20 23:14:16
Local clock offset: 11.162 ms
Remote clock offset: -12.612 ms

Below is generated by plot.py at 2017-11-20 23:25:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 5.03 Mbit/s
95th percentile per-packet one-way delay: 88.447 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 5.03 Mbit/s
95th percentile per-packet one-way delay: 88.447 ms
Loss rate: 0.12%
```
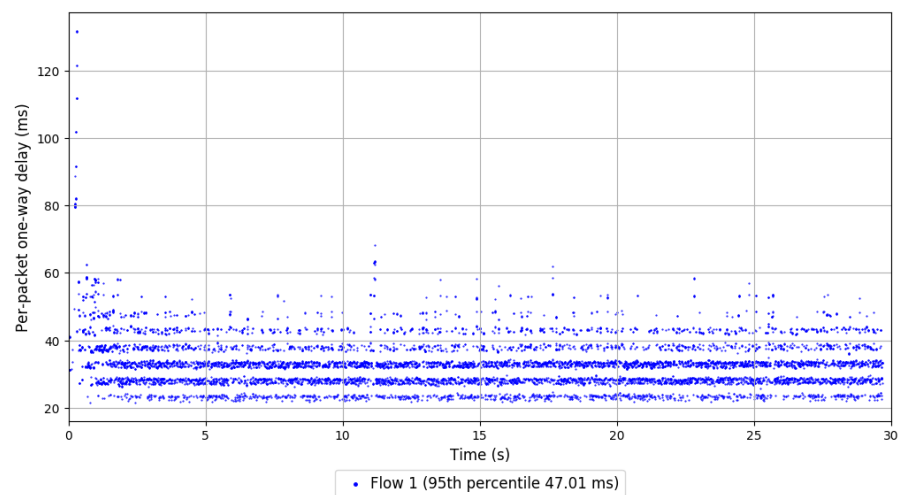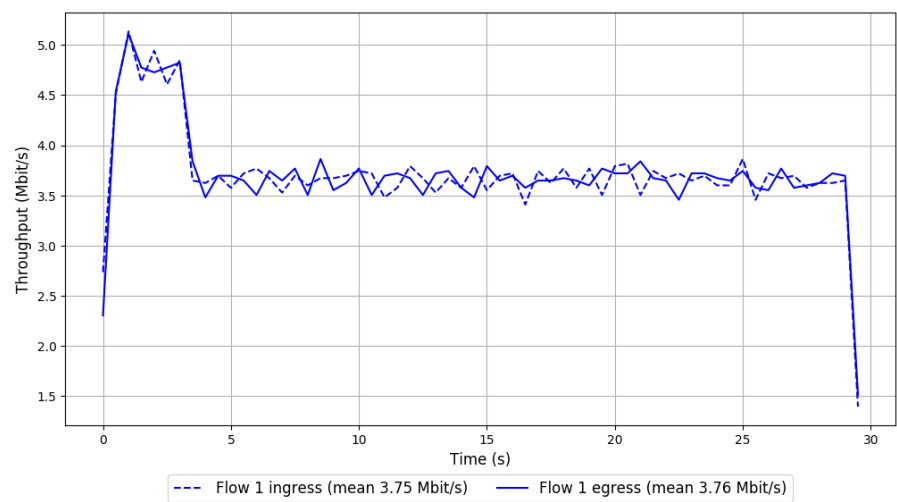
## Run 3: Report of Copa — Data Link

```
Run 1: Statistics of Indigo

Start at: 2017-11-20 22:35:04
End at: 2017-11-20 22:35:34
Local clock offset: 7.927 ms
Remote clock offset: -13.904 ms

Below is generated by plot.py at 2017-11-20 23:25:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.76 Mbit/s
95th percentile per-packet one-way delay: 47.009 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 3.76 Mbit/s
95th percentile per-packet one-way delay: 47.009 ms
Loss rate: 0.03%
```
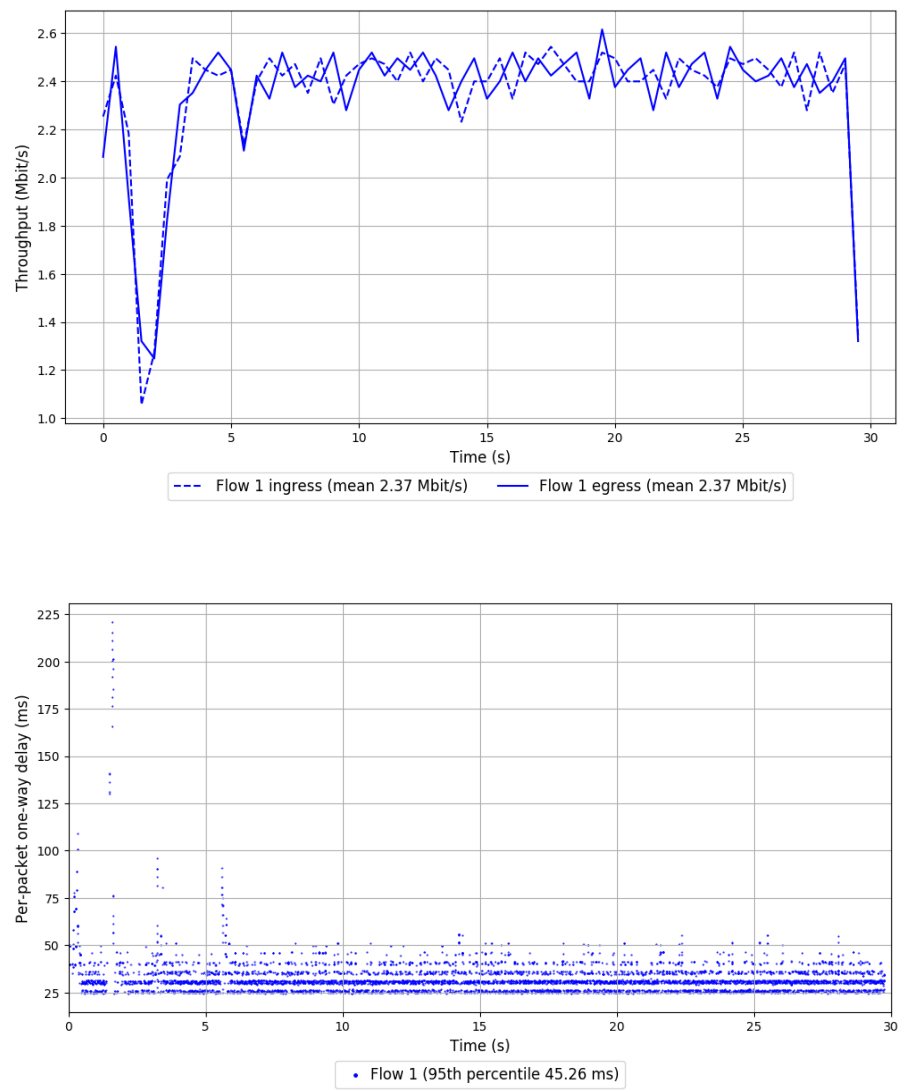
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-11-20 22:51:29
End at: 2017-11-20 22:51:59
Local clock offset: 8.279 ms
Remote clock offset: -12.281 ms

Below is generated by plot.py at 2017-11-20 23:25:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 45.261 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 45.261 ms
Loss rate: 0.12%
```
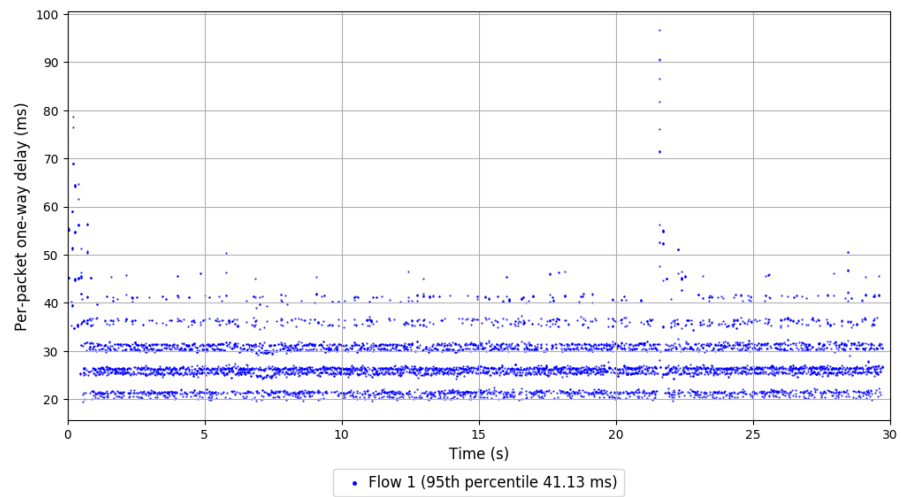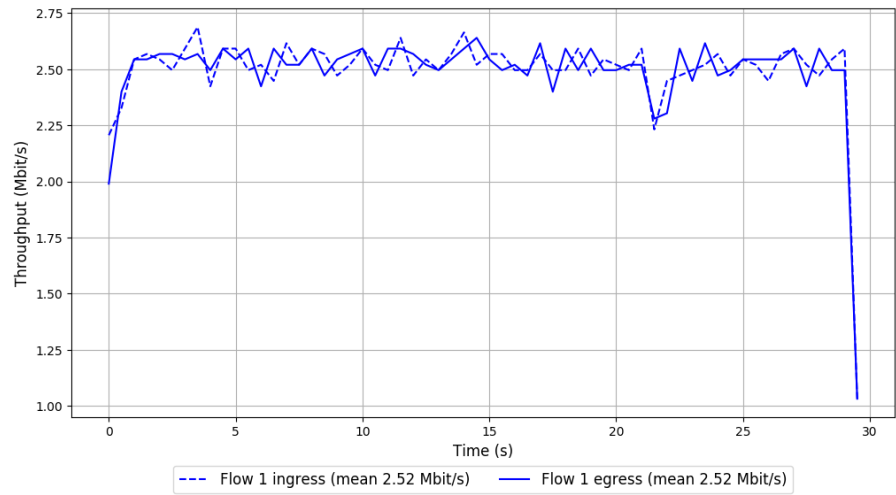
Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2017-11-20 23:07:54
End at: 2017-11-20 23:08:24
Local clock offset: 10.836 ms
Remote clock offset: -14.614 ms

Below is generated by plot.py at 2017-11-20 23:25:22
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 41.126 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 41.126 ms
Loss rate: 0.14%
```
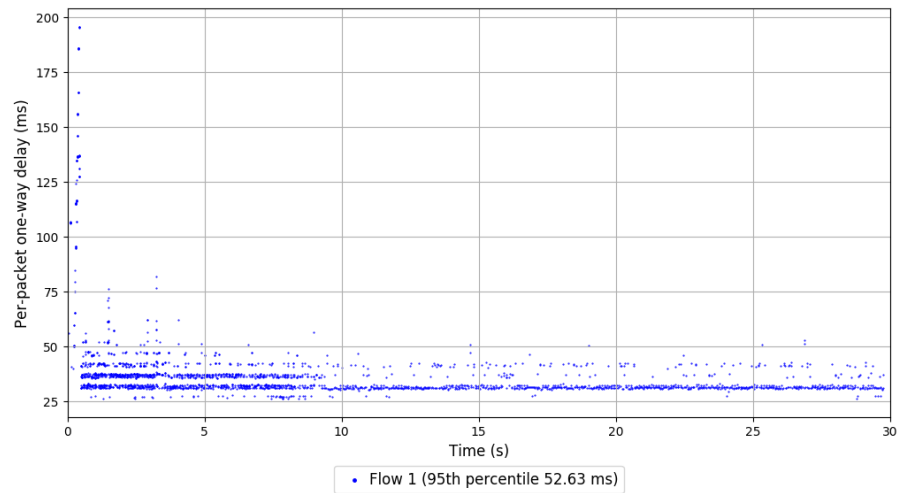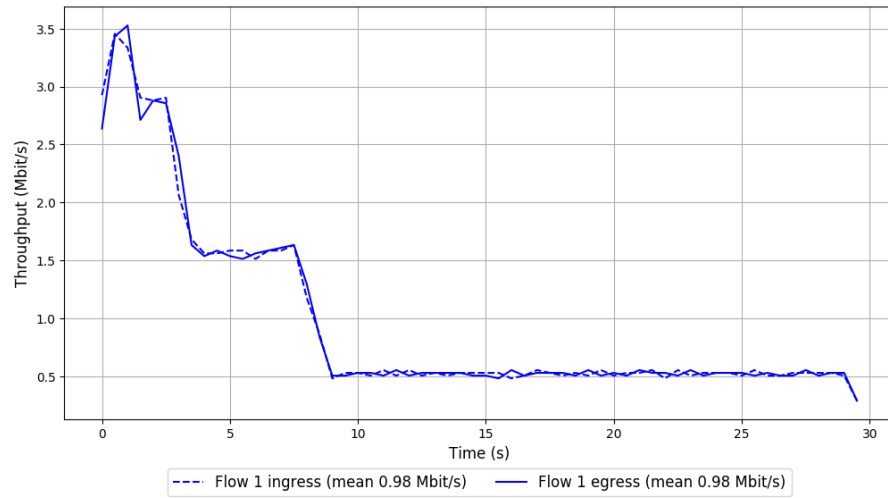
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of Indigo-calib

Start at: 2017-11-20 22:36:14
End at: 2017-11-20 22:36:44
Local clock offset: 10.148 ms
Remote clock offset: -13.249 ms


# Below is generated by plot.py at 2017-11-20 23:25:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 52.632 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 52.632 ms
Loss rate: 0.04%
```

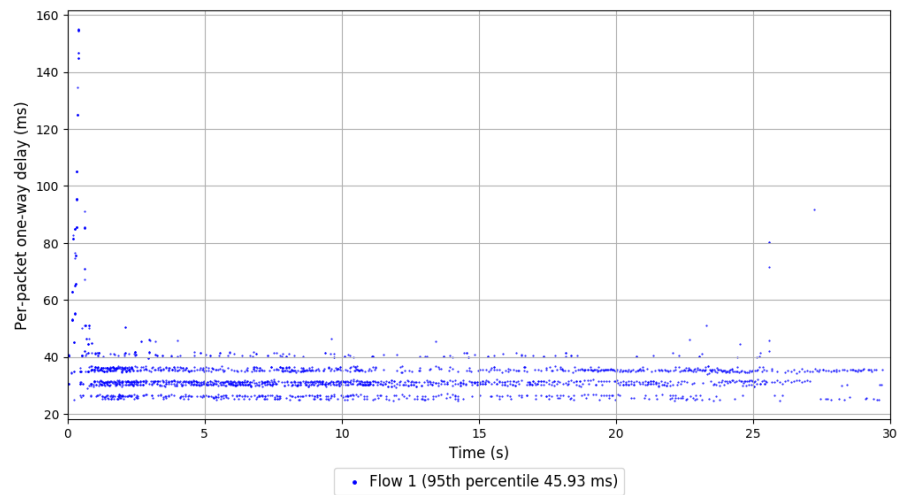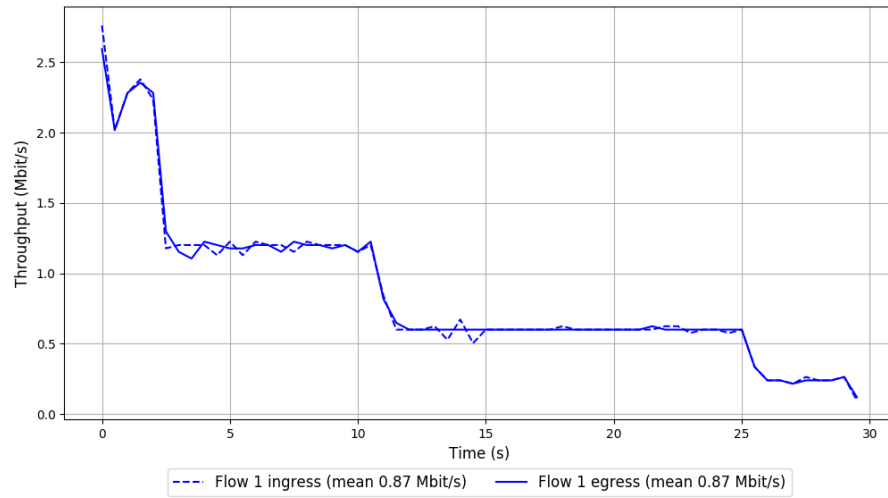Run 1: Report of Indigo-calib — Data Link

```
Run 2: Statistics of Indigo-calib

Start at: 2017-11-20 22:52:37
End at: 2017-11-20 22:53:07
Local clock offset: 13.125 ms
Remote clock offset: -12.477 ms


# Below is generated by plot.py at 2017-11-20 23:25:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 45.931 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 45.931 ms
Loss rate: 0.00%
```

Run 2: Report of Indigo-calib — Data Link

Flow 1 ingress (mean 0.87 Mbit/s)   Flow 1 egress (mean 0.87 Mbit/s)

Flow 1 (95th percentile 45.93 ms)

```
Run 3: Statistics of Indigo-calib

Start at: 2017-11-20 23:09:04
End at: 2017-11-20 23:09:34
Local clock offset: 9.228 ms
Remote clock offset: -12.609 ms


# Below is generated by plot.py at 2017-11-20 23:25:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 44.416 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 44.416 ms
Loss rate: 0.08%
```

Run 3: Report of Indigo-calib — Data Link

Flow 1 ingress (mean 1.83 Mbit/s)   ----   Flow 1 egress (mean 1.83 Mbit/s) ———

Flow 1 (95th percentile 44.42 ms)