Pantheon Report

Generated at 2017-11-20 23:22:32 (UTC).

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

Repeated the test of 14 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

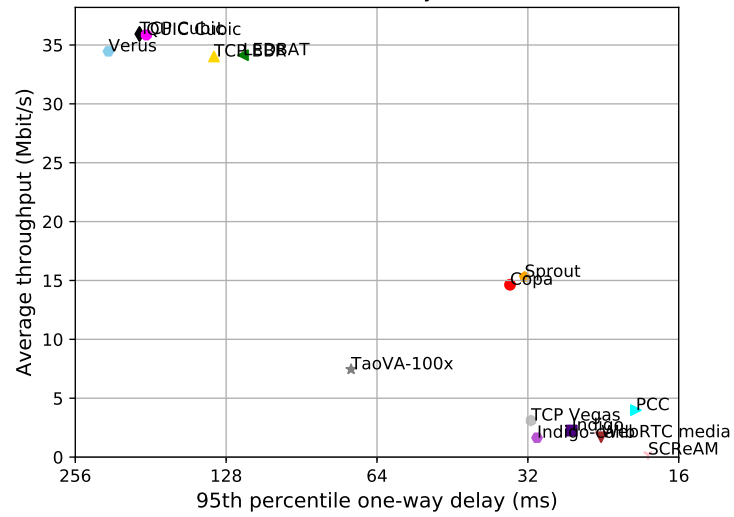Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

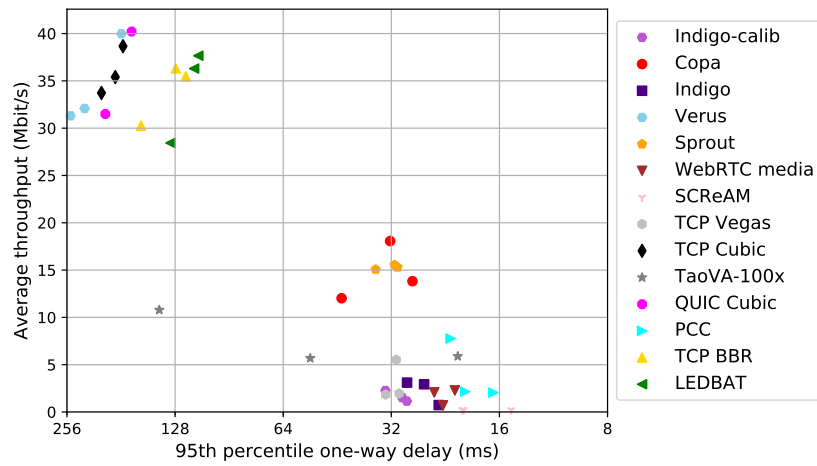NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

```
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 California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme (mean of all runs by scheme)

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

2

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	34.02	135.37	0.17
TCP Cubic	3	35.93	190.58	0.22
LEDBAT	3	34.13	118.48	0.07
PCC	3	3.99	19.48	0.00
QUIC Cubic	2	35.86	184.68	0.35
SCReAM	3	0.22	18.43	0.00
WebRTC media	3	1.68	22.86	0.00
Sprout	3	15.31	32.49	0.00
TaoVA-100x	3	7.46	72.11	0.25
TCP Vegas	3	3.10	31.54	0.00
Verus	3	34.46	219.82	4.07
Copa	3	14.64	34.74	0.04
Indigo	3	2.26	26.16	0.00
Indigo-calib	3	1.64	30.68	0.00

```
Run 1: Statistics of TCP BBR

Start at: 2017-11-20 22:38:52
End at: 2017-11-20 22:39:23
Local clock offset: -5.153 ms
Remote clock offset: -2.619 ms

# Below is generated by plot.py at 2017-11-20 23:21:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 30.28 Mbit/s
95th percentile per-packet one-way delay: 159.186 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 30.28 Mbit/s
95th percentile per-packet one-way delay: 159.186 ms
Loss rate: 0.23%
```
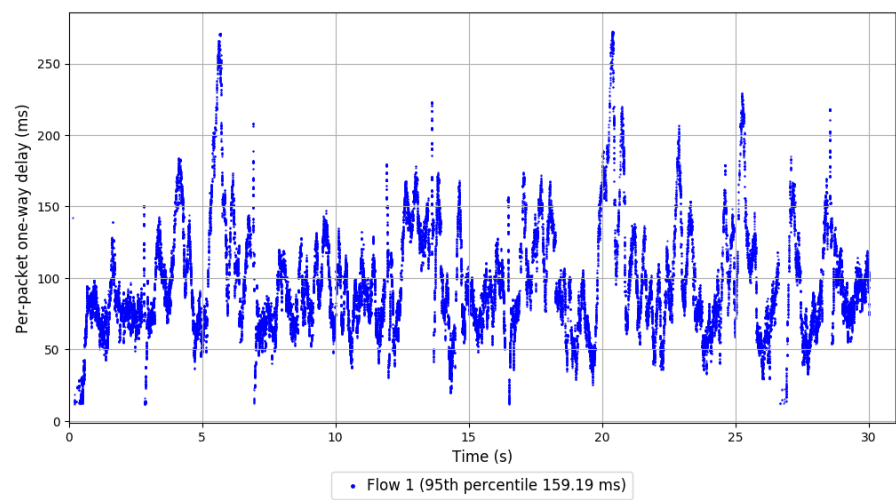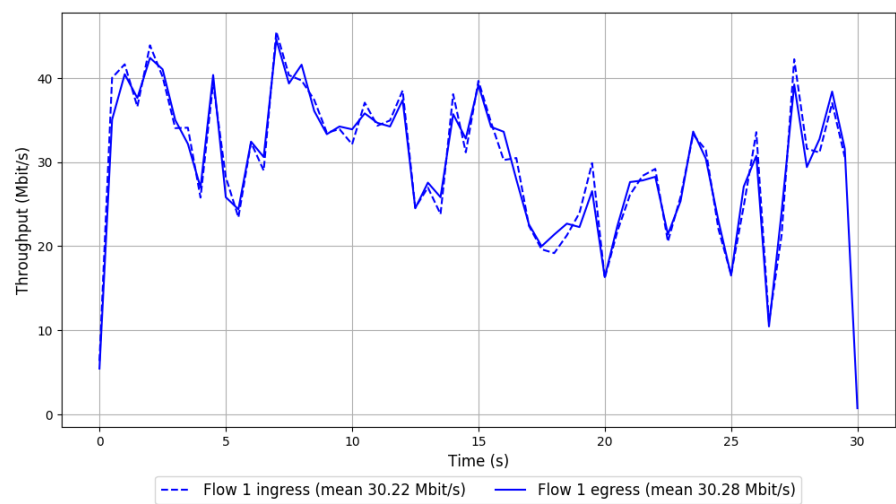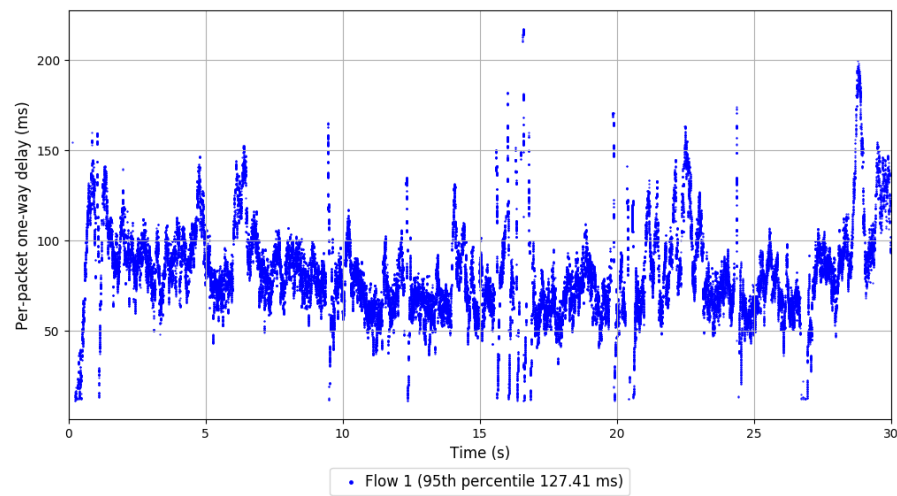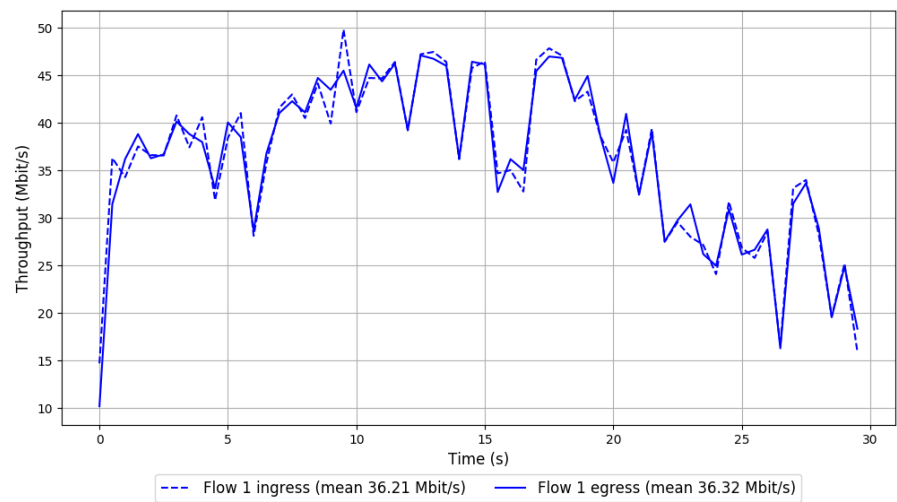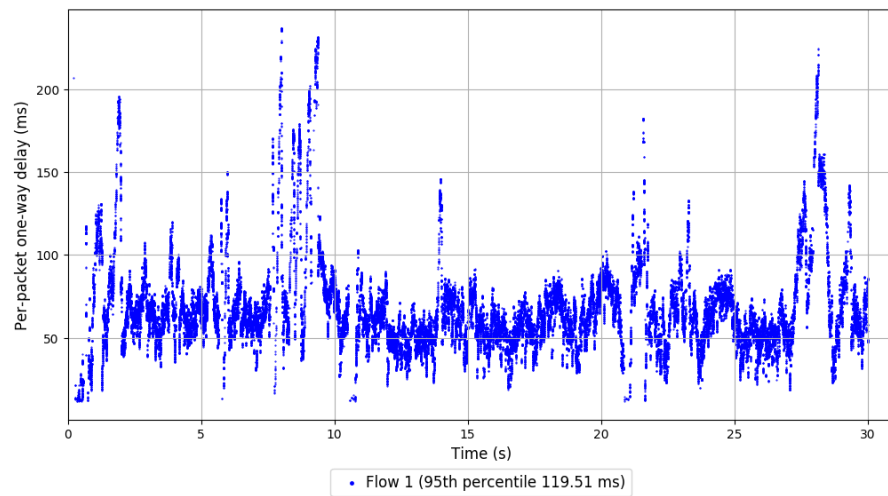
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-11-20 22:55:27
End at: 2017-11-20 22:55:57
Local clock offset: -6.458 ms
Remote clock offset: -2.711 ms


# Below is generated by plot.py at 2017-11-20 23:21:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 36.32 Mbit/s
95th percentile per-packet one-way delay: 127.407 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 36.32 Mbit/s
95th percentile per-packet one-way delay: 127.407 ms
Loss rate: 0.13%
```
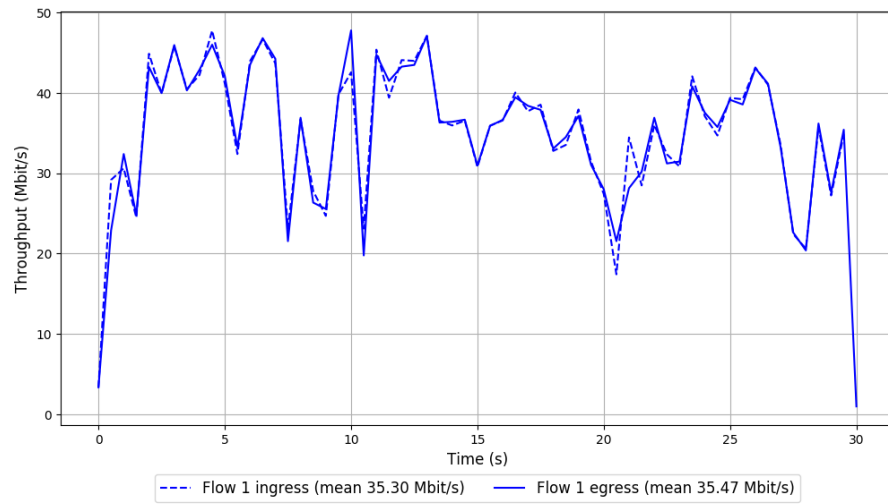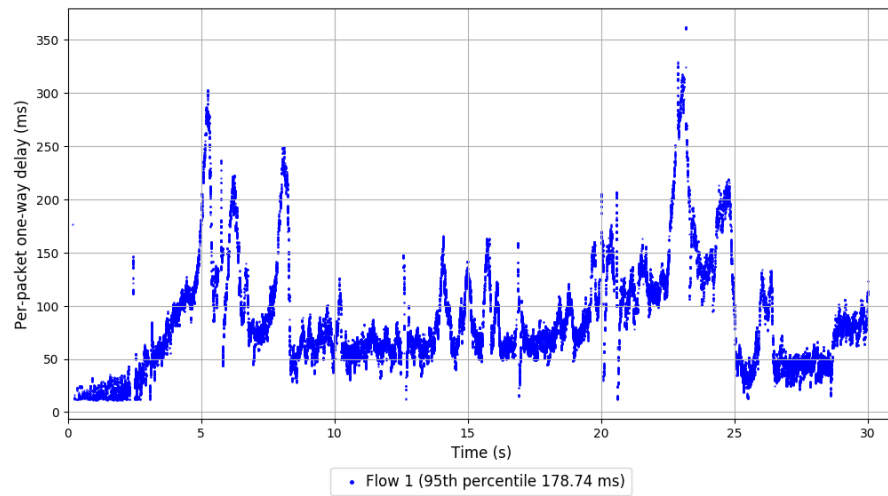
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2017-11-20 23:12:02
End at: 2017-11-20 23:12:32
Local clock offset: -8.337 ms
Remote clock offset: -2.682 ms

# Below is generated by plot.py at 2017-11-20 23:21:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 35.47 Mbit/s
95th percentile per-packet one-way delay: 119.507 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 35.47 Mbit/s
95th percentile per-packet one-way delay: 119.507 ms
Loss rate: 0.14%
```

Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 35.30 Mbit/s)   Flow 1 egress (mean 35.47 Mbit/s)

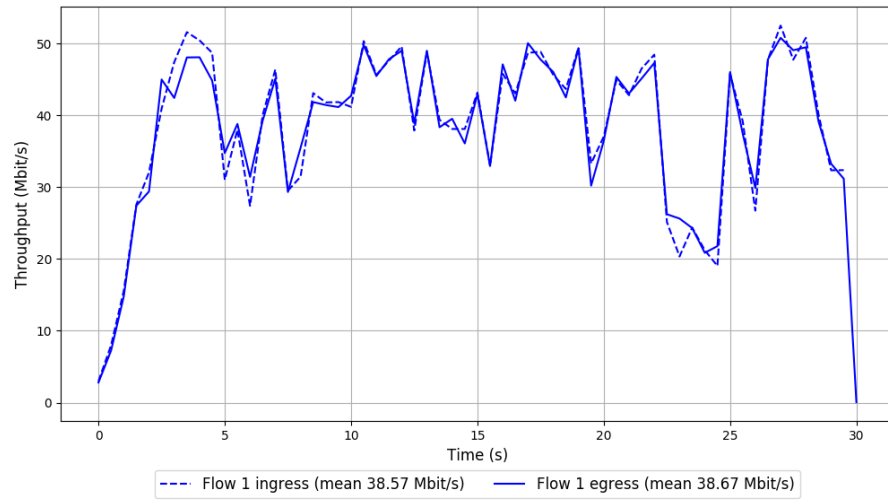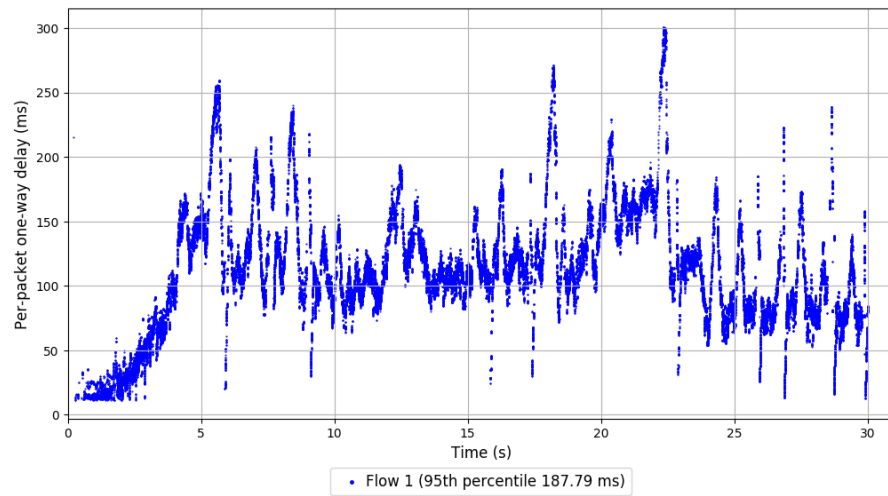Flow 1 (95th percentile 119.51 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2017-11-20 22:36:30
End at: 2017-11-20 22:37:00
Local clock offset: -5.011 ms
Remote clock offset: -2.651 ms


# Below is generated by plot.py at 2017-11-20 23:21:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 38.67 Mbit/s
95th percentile per-packet one-way delay: 178.739 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 38.67 Mbit/s
95th percentile per-packet one-way delay: 178.739 ms
Loss rate: 0.25%
```

Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 38.57 Mbit/s)   Flow 1 egress (mean 38.67 Mbit/s)

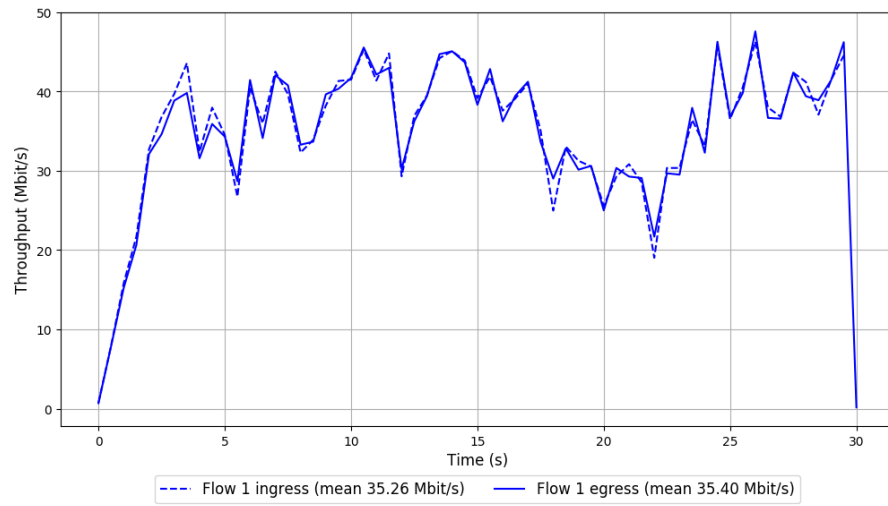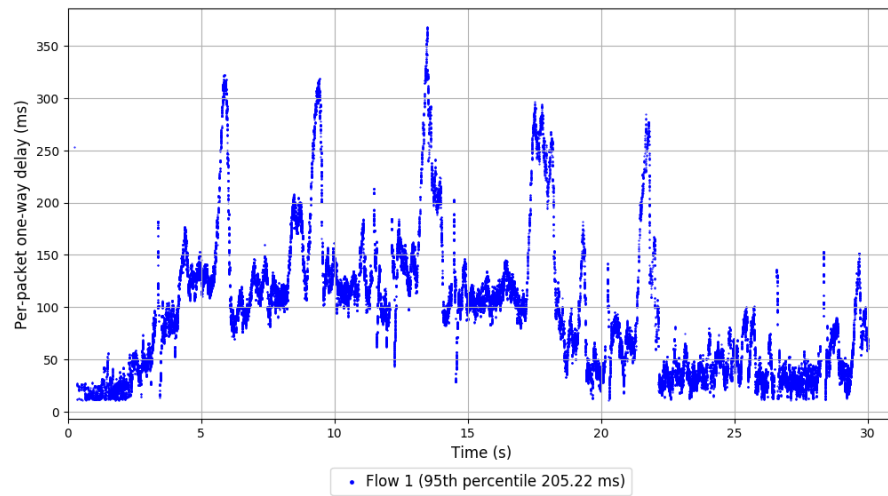

Flow 1 (95th percentile 178.74 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2017-11-20 22:53:05
End at: 2017-11-20 22:53:35
Local clock offset: -6.372 ms
Remote clock offset: -2.748 ms


# Below is generated by plot.py at 2017-11-20 23:21:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 35.40 Mbit/s
95th percentile per-packet one-way delay: 187.793 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 35.40 Mbit/s
95th percentile per-packet one-way delay: 187.793 ms
Loss rate: 0.28%
```
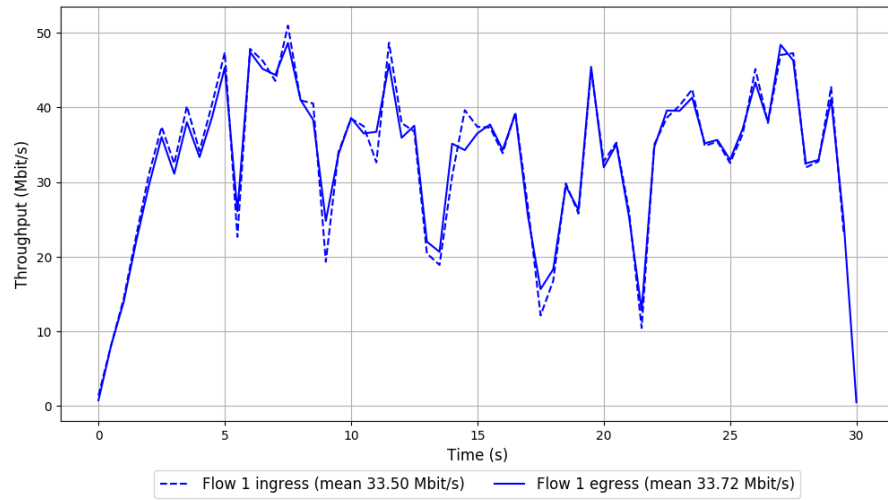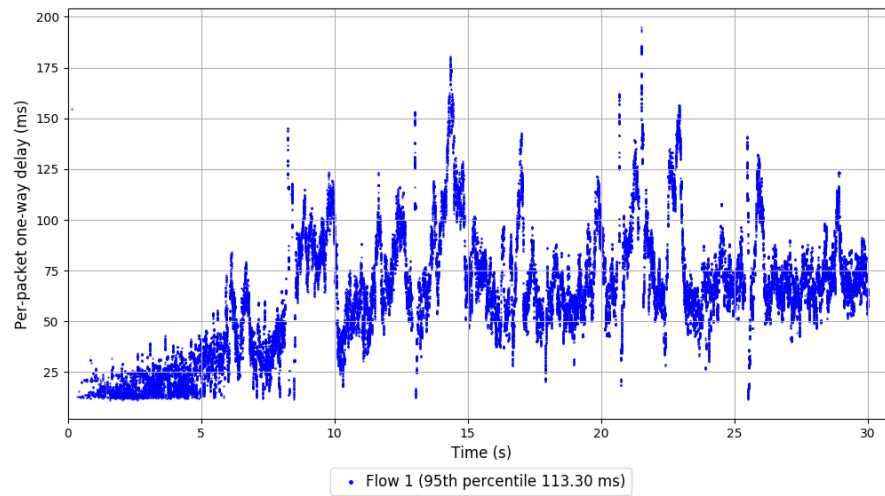
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-11-20 23:09:40
End at: 2017-11-20 23:10:10
Local clock offset: -8.214 ms
Remote clock offset: -2.782 ms


# Below is generated by plot.py at 2017-11-20 23:21:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 33.72 Mbit/s
95th percentile per-packet one-way delay: 205.216 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 33.72 Mbit/s
95th percentile per-packet one-way delay: 205.216 ms
Loss rate: 0.13%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 33.50 Mbit/s) --- Flow 1 egress (mean 33.72 Mbit/s)
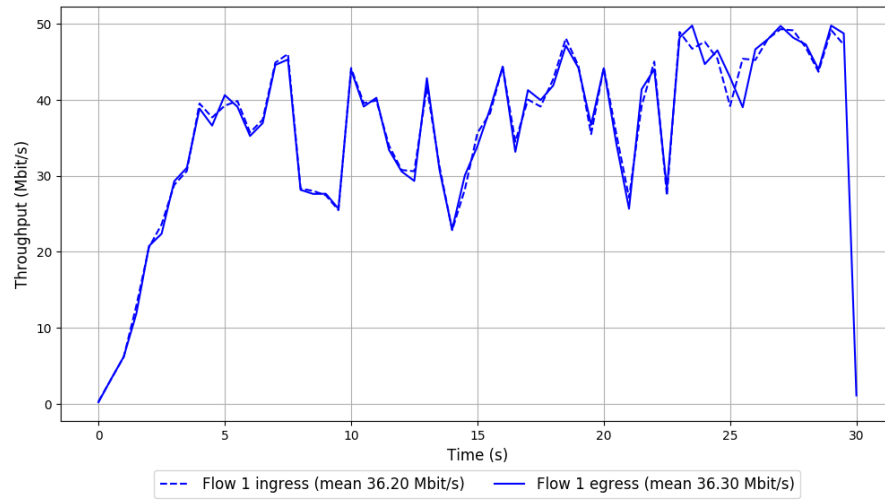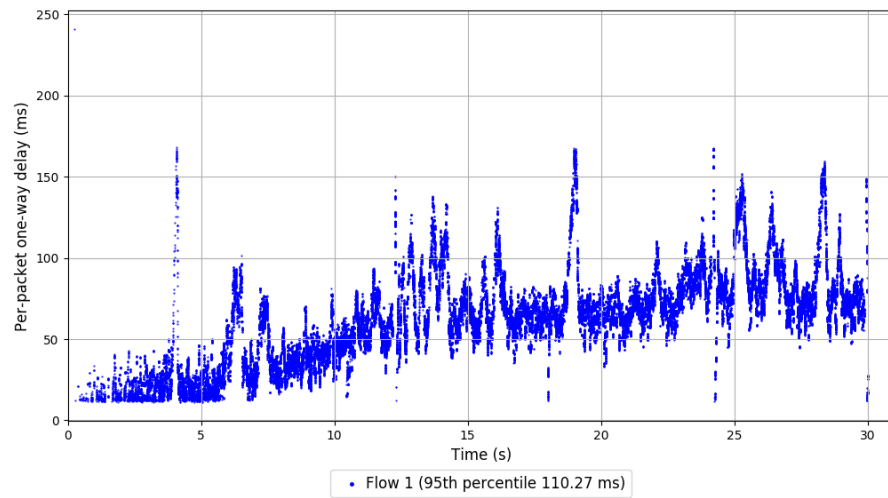

• Flow 1 (95th percentile 205.22 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2017-11-20 22:44:47
End at: 2017-11-20 22:45:17
Local clock offset: -5.854 ms
Remote clock offset: -2.716 ms

# Below is generated by plot.py at 2017-11-20 23:21:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 36.30 Mbit/s
95th percentile per-packet one-way delay: 113.297 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 36.30 Mbit/s
95th percentile per-packet one-way delay: 113.297 ms
Loss rate: 0.16%
```

Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 36.20 Mbit/s)   Flow 1 egress (mean 36.30 Mbit/s)

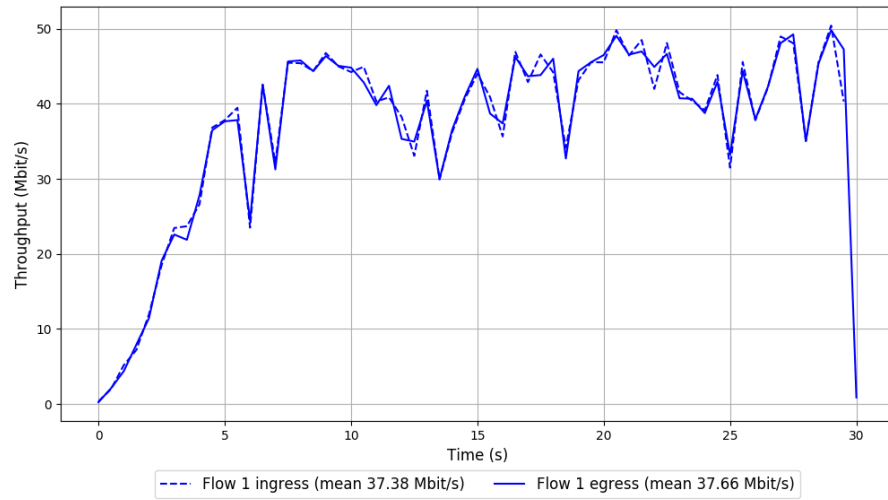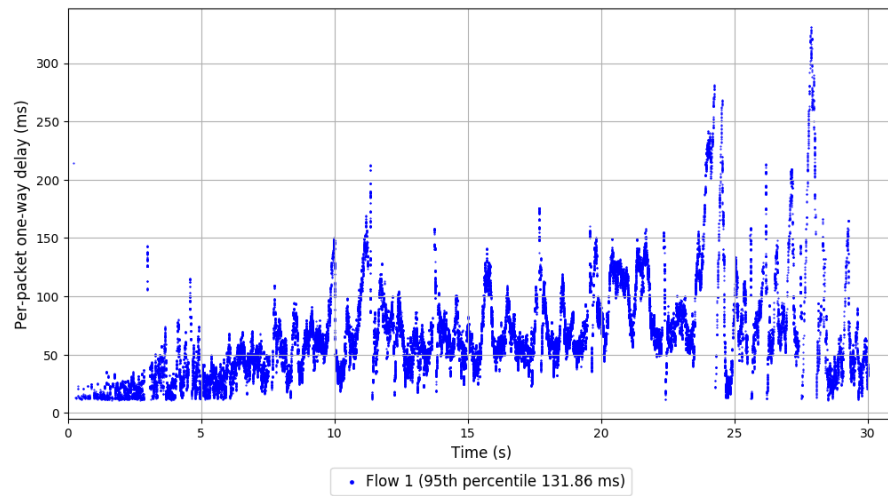• Flow 1 (95th percentile 113.30 ms)

```
Run 2: Statistics of LEDBAT

Start at: 2017-11-20 23:01:23
End at: 2017-11-20 23:01:53
Local clock offset: -7.098 ms
Remote clock offset: -2.877 ms

# Below is generated by plot.py at 2017-11-20 23:21:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 37.66 Mbit/s
95th percentile per-packet one-way delay: 110.269 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 37.66 Mbit/s
95th percentile per-packet one-way delay: 110.269 ms
Loss rate: 0.00%
```

Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 37.38 Mbit/s) Flow 1 egress (mean 37.66 Mbit/s)

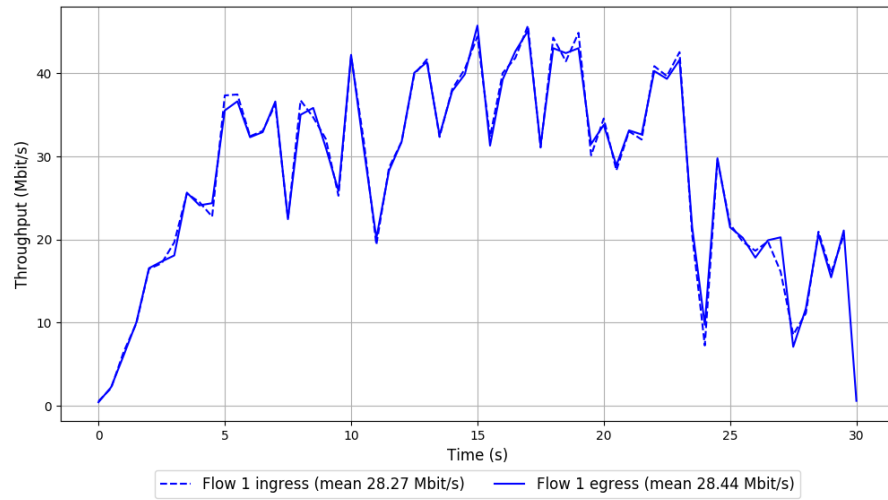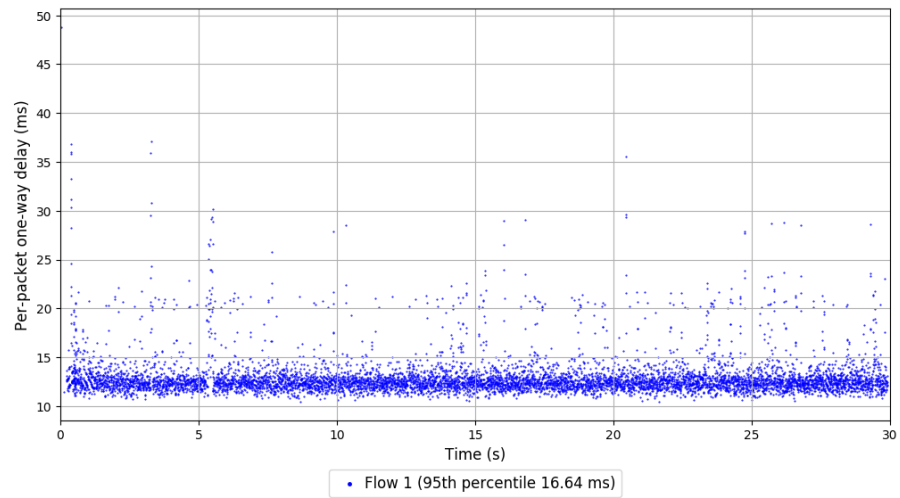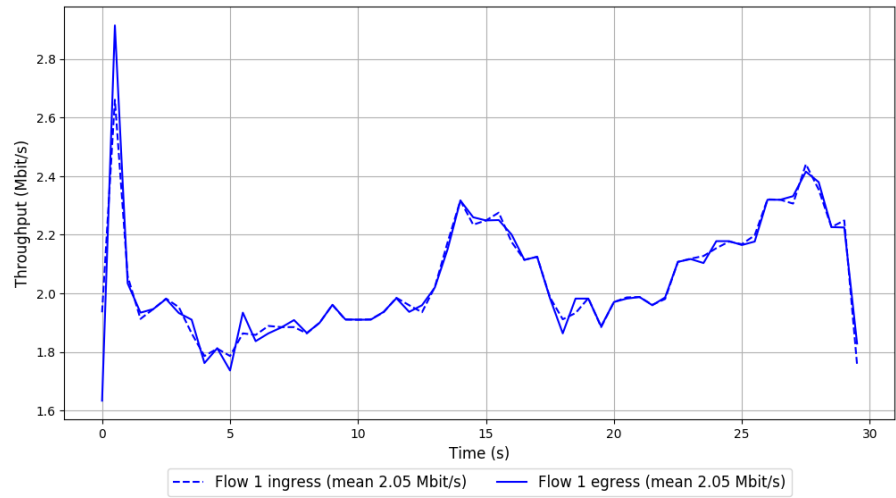Flow 1 (95th percentile 110.27 ms)

```
Run 3: Statistics of LEDBAT

Start at: 2017-11-20 23:17:58
End at: 2017-11-20 23:18:28
Local clock offset: -4.882 ms
Remote clock offset: -2.682 ms

# Below is generated by plot.py at 2017-11-20 23:21:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 28.44 Mbit/s
95th percentile per-packet one-way delay: 131.861 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 28.44 Mbit/s
95th percentile per-packet one-way delay: 131.861 ms
Loss rate: 0.04%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 28.27 Mbit/s)   Flow 1 egress (mean 28.44 Mbit/s)

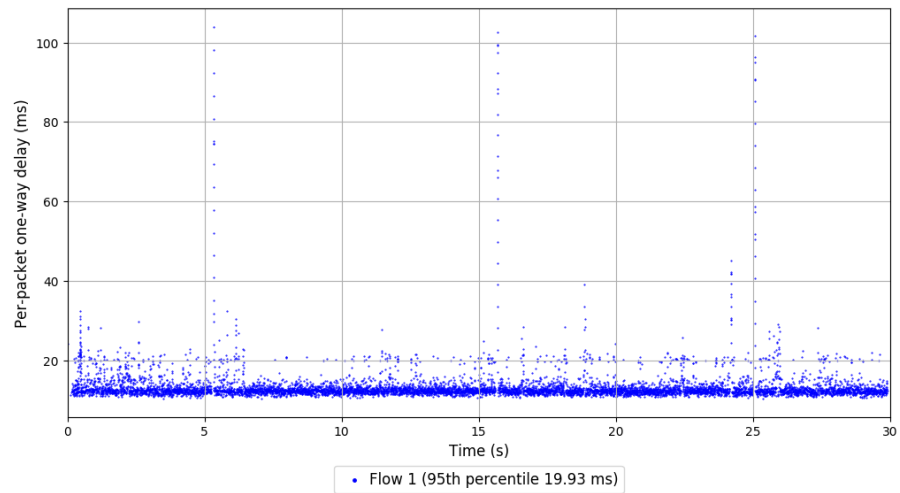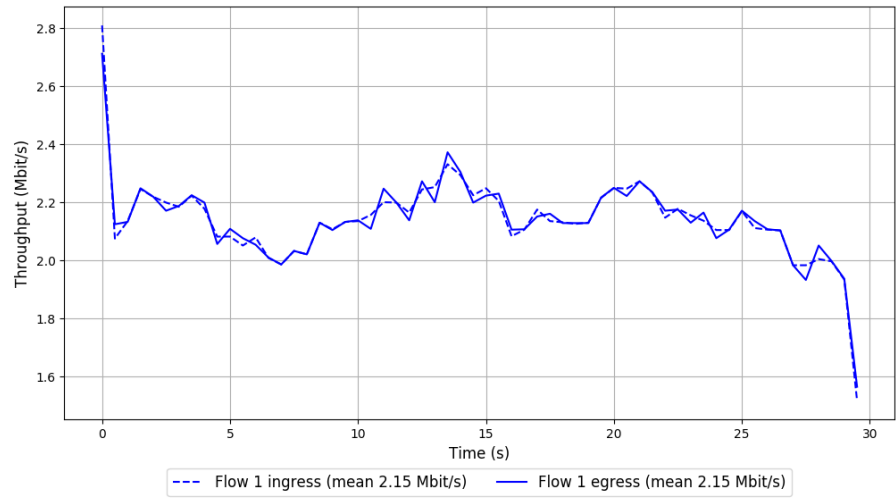Flow 1 (95th percentile 131.86 ms)

```
Run 1: Statistics of PCC

Start at: 2017-11-20 22:45:59
End at: 2017-11-20 22:46:29
Local clock offset: -6.018 ms
Remote clock offset: -2.708 ms

# Below is generated by plot.py at 2017-11-20 23:21:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 16.635 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 16.635 ms
Loss rate: 0.00%
```
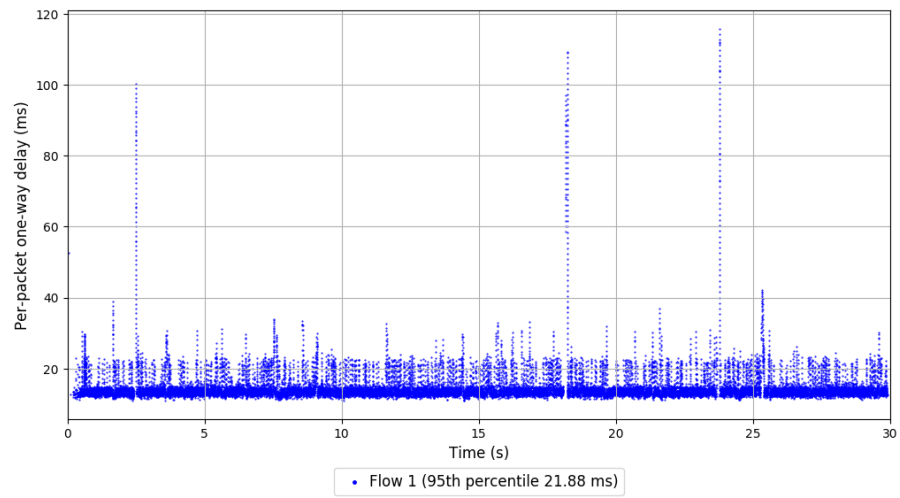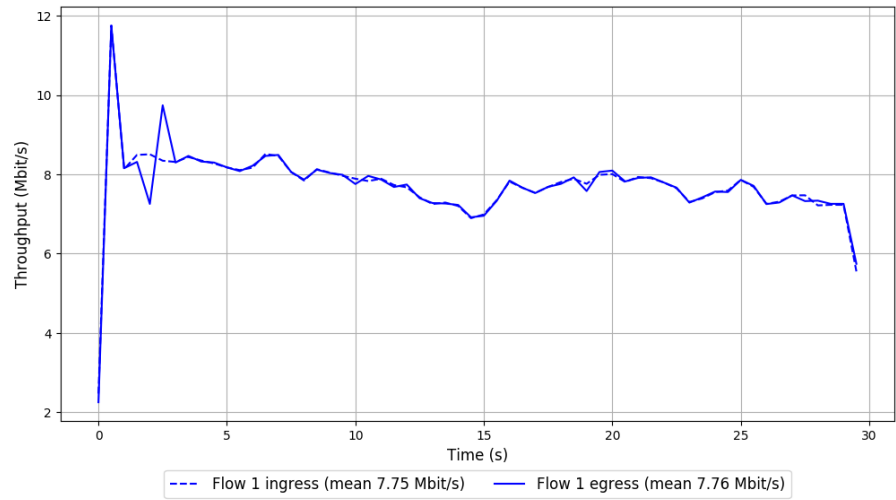
Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 2.05 Mbit/s)   Flow 1 egress (mean 2.05 Mbit/s)

Flow 1 (95th percentile 16.64 ms)

23

```
Run 2: Statistics of PCC

Start at: 2017-11-20 23:02:35
End at: 2017-11-20 23:03:05
Local clock offset: -7.249 ms
Remote clock offset: -2.862 ms

# Below is generated by plot.py at 2017-11-20 23:21:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 19.934 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 19.934 ms
Loss rate: 0.00%
```

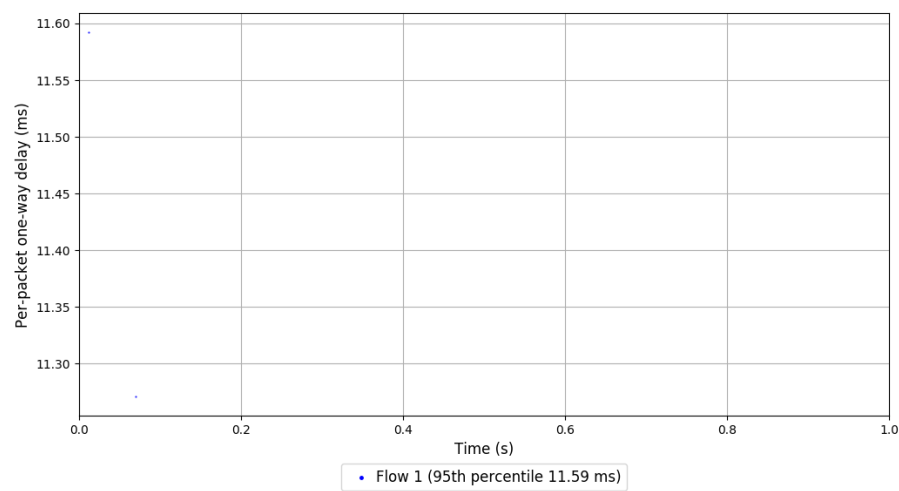Run 2: Report of PCC — Data Link

```
Run 3: Statistics of PCC

Start at: 2017-11-20 23:19:09
End at: 2017-11-20 23:19:39
Local clock offset: -4.514 ms
Remote clock offset: -2.617 ms


# Below is generated by plot.py at 2017-11-20 23:21:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.76 Mbit/s
95th percentile per-packet one-way delay: 21.883 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 7.76 Mbit/s
95th percentile per-packet one-way delay: 21.883 ms
Loss rate: 0.00%
```

Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 7.75 Mbit/s)   Flow 1 egress (mean 7.76 Mbit/s)

Flow 1 (95th percentile 21.88 ms)

27

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-11-20 22:35:20
End at: 2017-11-20 22:35:50
Local clock offset: -5.069 ms
Remote clock offset: -2.689 ms
```
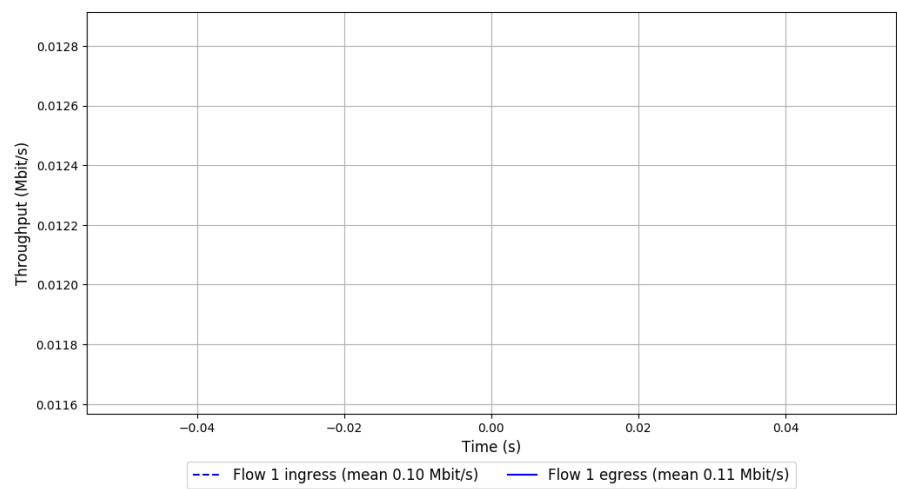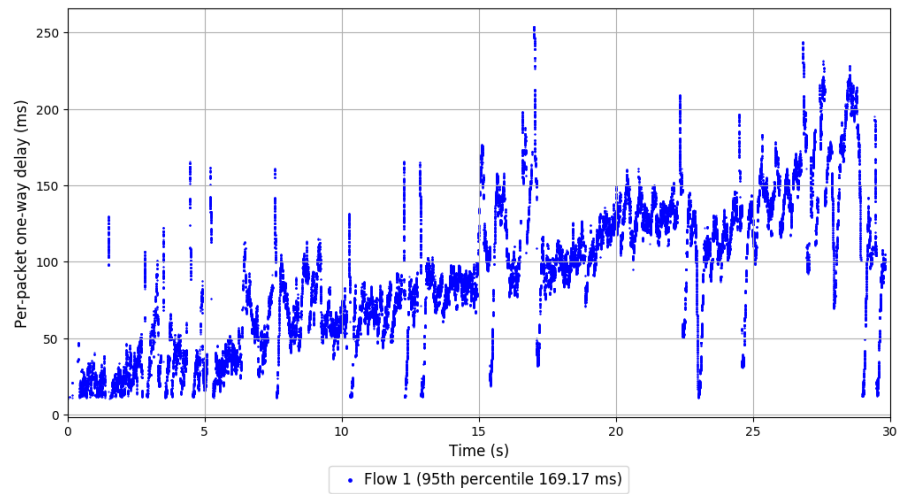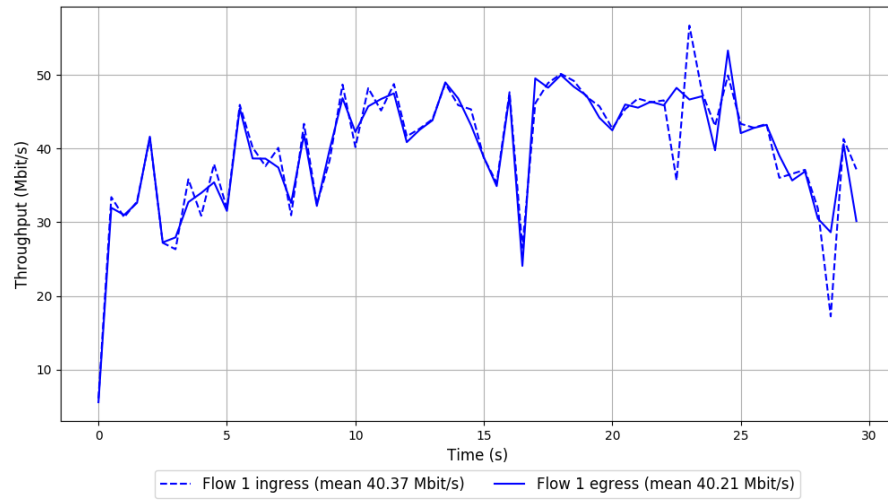
Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.10 Mbit/s) --- Flow 1 egress (mean 0.11 Mbit/s)

Flow 1 (95th percentile 11.59 ms)

```
Run 2: Statistics of QUIC Cubic

Start at: 2017-11-20 22:51:53
End at: 2017-11-20 22:52:23
Local clock offset: -6.361 ms
Remote clock offset: -2.807 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 40.21 Mbit/s
95th percentile per-packet one-way delay: 169.174 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 40.21 Mbit/s
95th percentile per-packet one-way delay: 169.174 ms
Loss rate: 0.35%
```
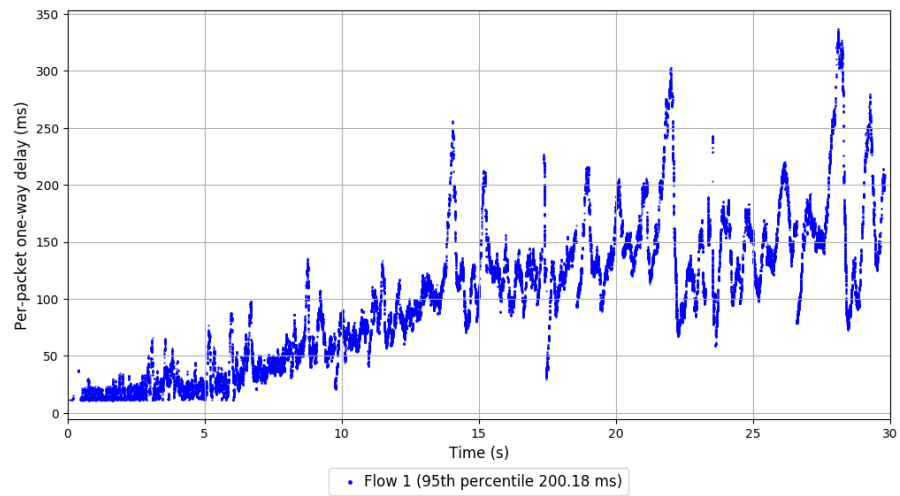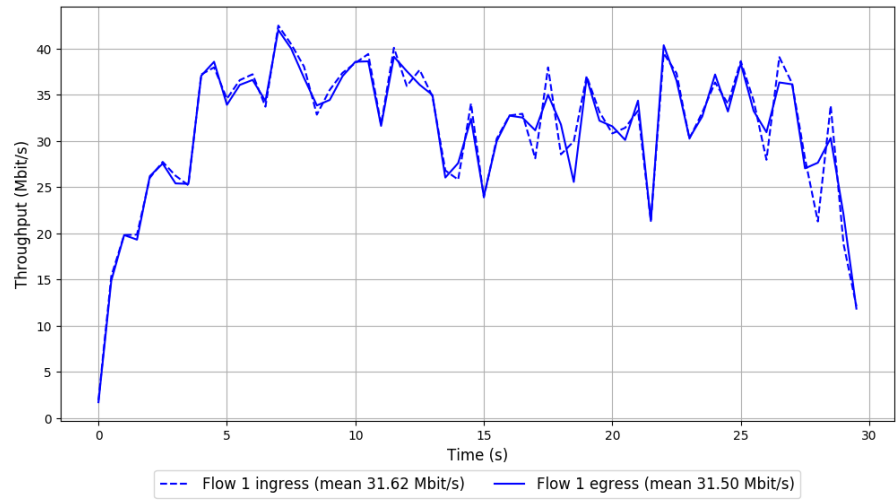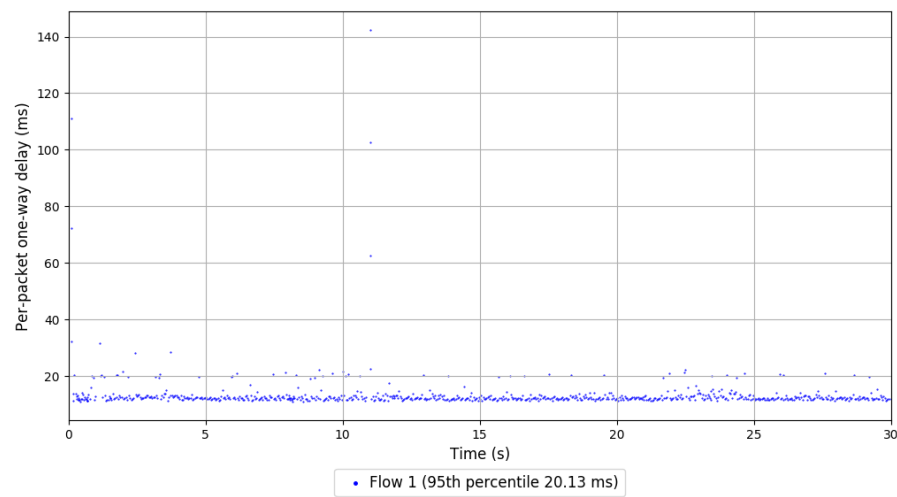
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 40.37 Mbit/s)   —— Flow 1 egress (mean 40.21 Mbit/s)

• Flow 1 (95th percentile 169.17 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-11-20 23:08:28
End at: 2017-11-20 23:08:58
Local clock offset: -8.074 ms
Remote clock offset: -2.806 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 31.50 Mbit/s
95th percentile per-packet one-way delay: 200.183 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 31.50 Mbit/s
95th percentile per-packet one-way delay: 200.183 ms
Loss rate: 0.35%
```

Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 31.62 Mbit/s) --- Flow 1 egress (mean 31.50 Mbit/s)
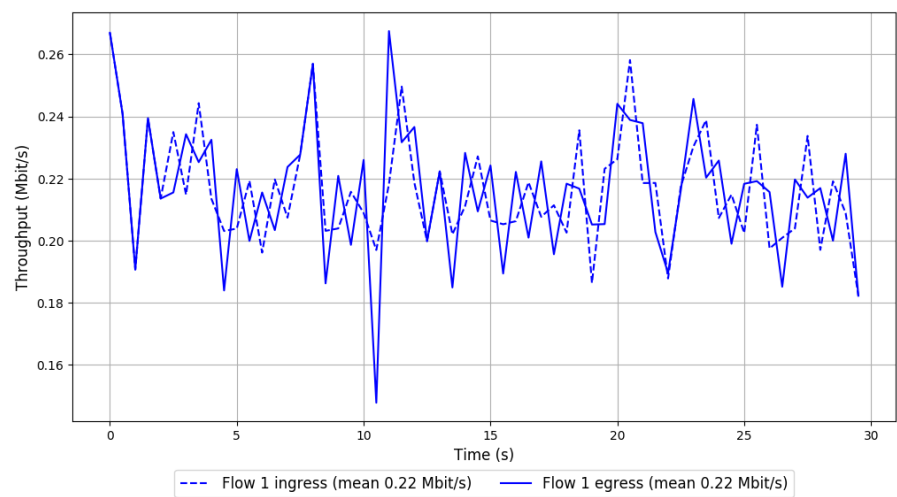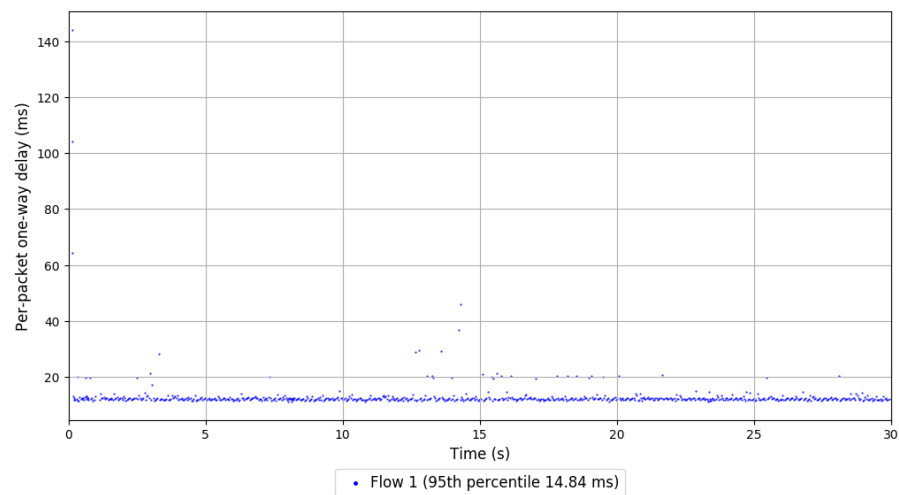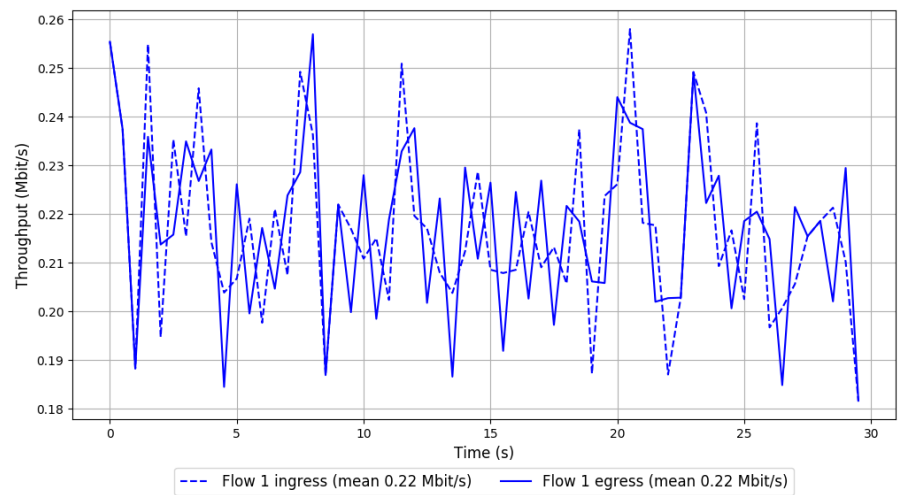

Flow 1 (95th percentile 200.18 ms)

```
Run 1: Statistics of SCReAM

Start at: 2017-11-20 22:40:04
End at: 2017-11-20 22:40:34
Local clock offset: -5.326 ms
Remote clock offset: -2.733 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.132 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.132 ms
Loss rate: 0.00%
```
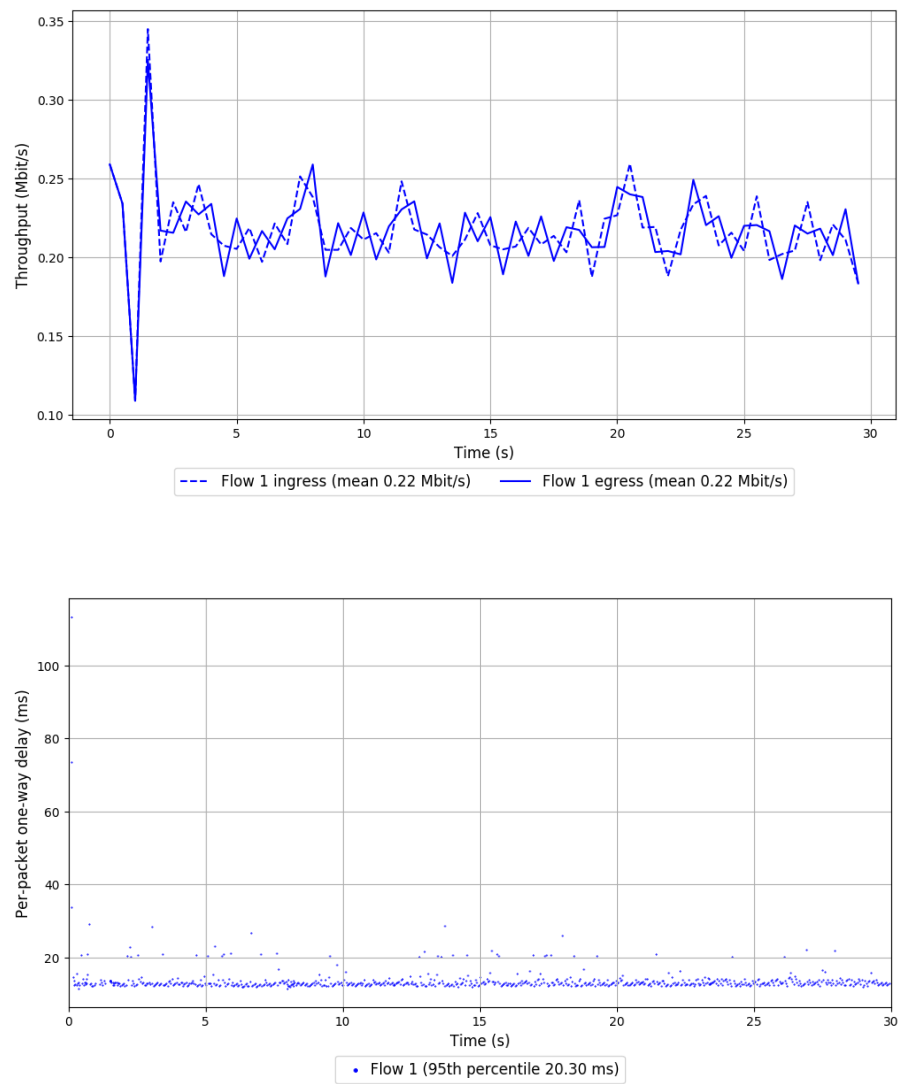
Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.22 Mbit/s)   Flow 1 egress (mean 0.22 Mbit/s)

Flow 1 (95th percentile 20.13 ms)

```
Run 2: Statistics of SCReAM

Start at: 2017-11-20 22:56:38
End at: 2017-11-20 22:57:09
Local clock offset: -6.543 ms
Remote clock offset: -2.838 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 14.841 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 14.841 ms
Loss rate: 0.00%
```
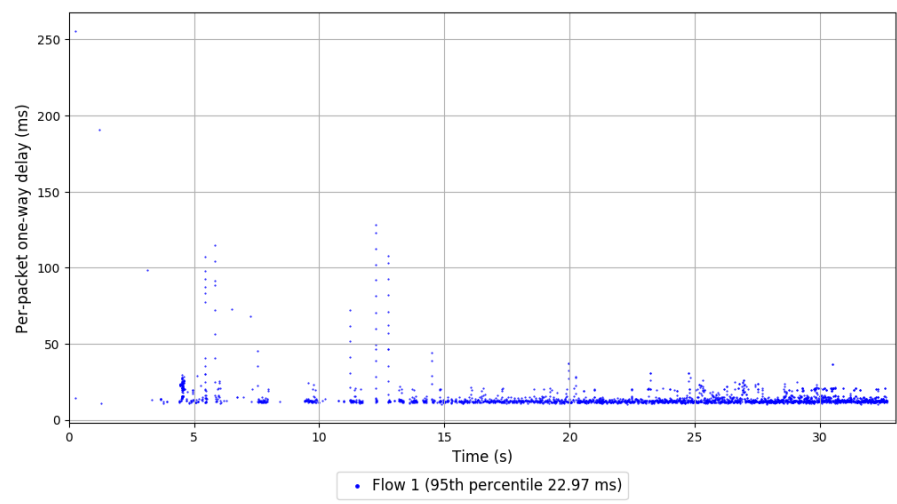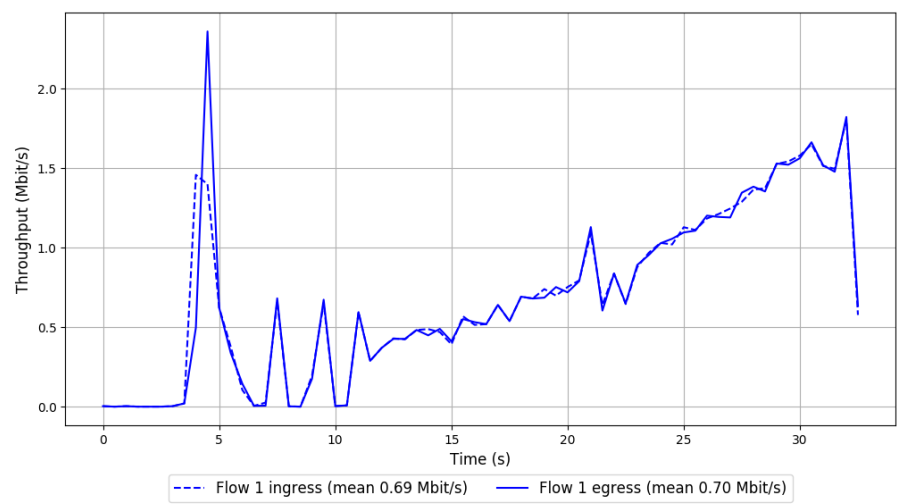
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2017-11-20 23:13:14
End at: 2017-11-20 23:13:44
Local clock offset: -7.776 ms
Remote clock offset: -2.768 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.305 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 20.305 ms
Loss rate: 0.00%
```
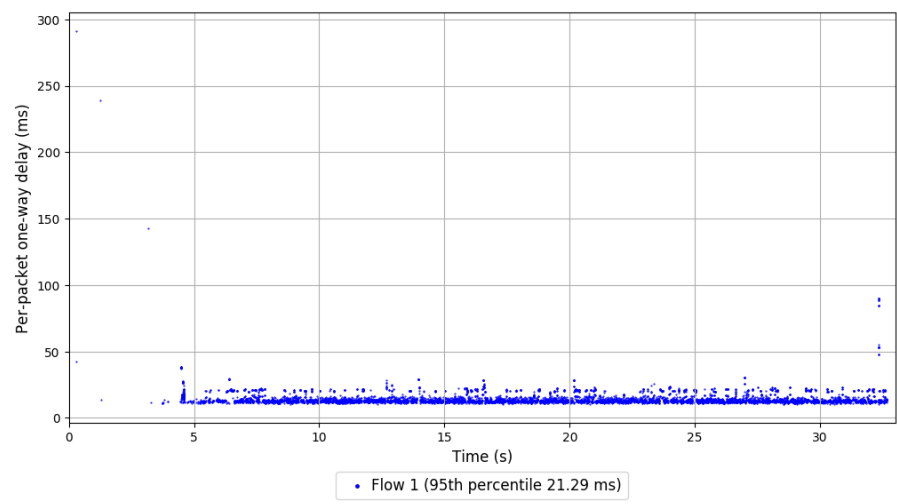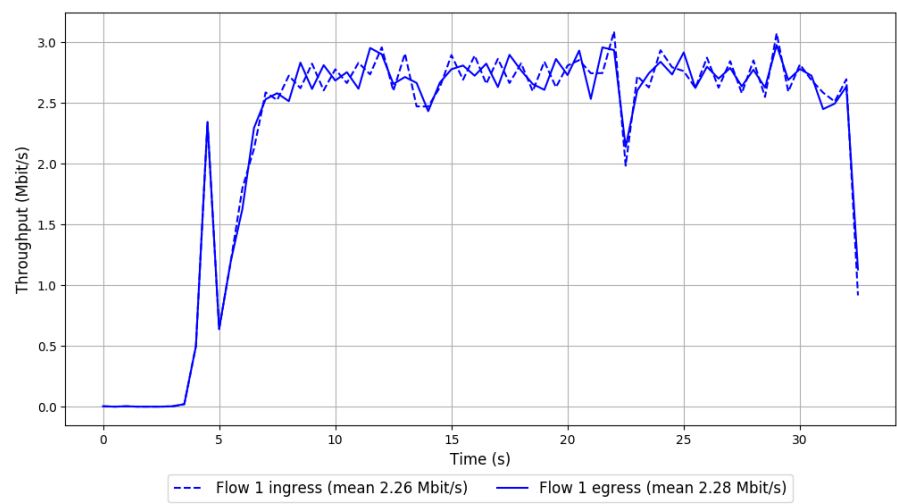
Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2017-11-20 22:30:36
End at: 2017-11-20 22:31:06
Local clock offset: -4.991 ms
Remote clock offset: -2.683 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 22.974 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 22.974 ms
Loss rate: 0.00%
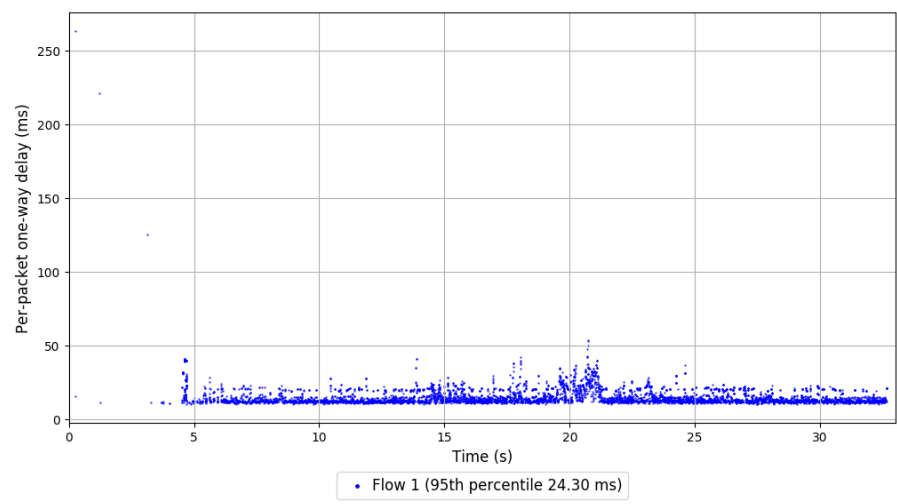```

Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2017-11-20 22:47:10
End at: 2017-11-20 22:47:40
Local clock offset: -6.218 ms
Remote clock offset: -2.728 ms

Below is generated by plot.py at 2017-11-20 23:22:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 21.289 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 21.289 ms
Loss rate: 0.00%
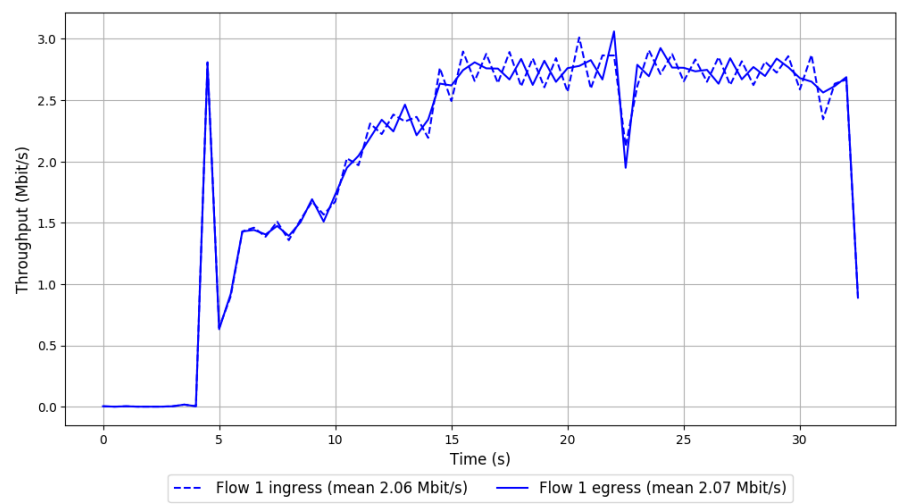```

Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2017-11-20 23:03:45
End at: 2017-11-20 23:04:15
Local clock offset: -7.381 ms
Remote clock offset: -2.885 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 24.302 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.07 Mbit/s
95th percentile per-packet one-way delay: 24.302 ms
Loss rate: 0.00%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 2.06 Mbit/s)   Flow 1 egress (mean 2.07 Mbit/s)

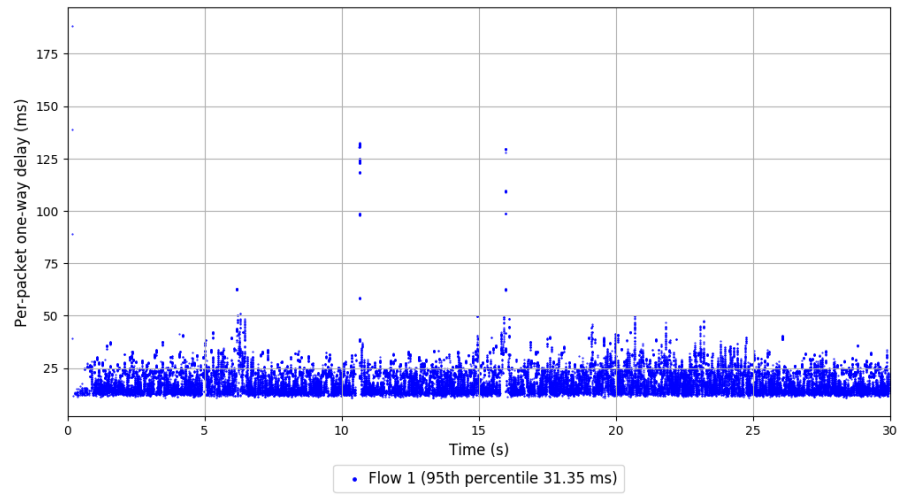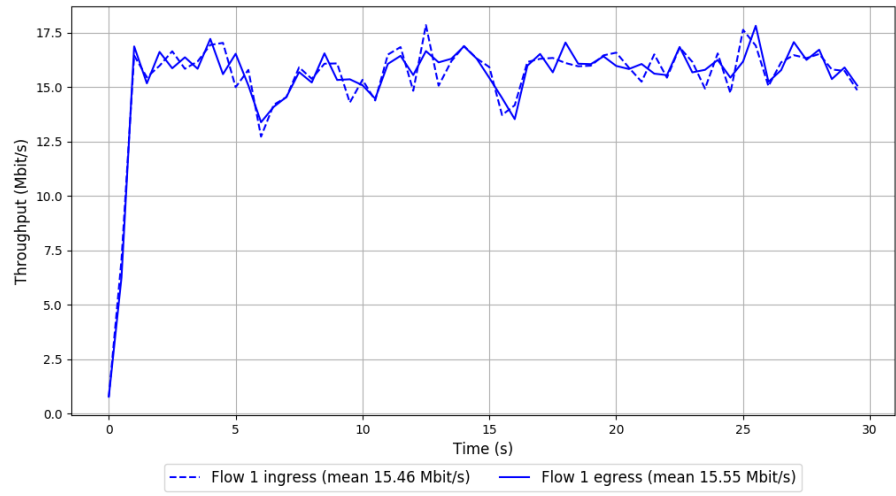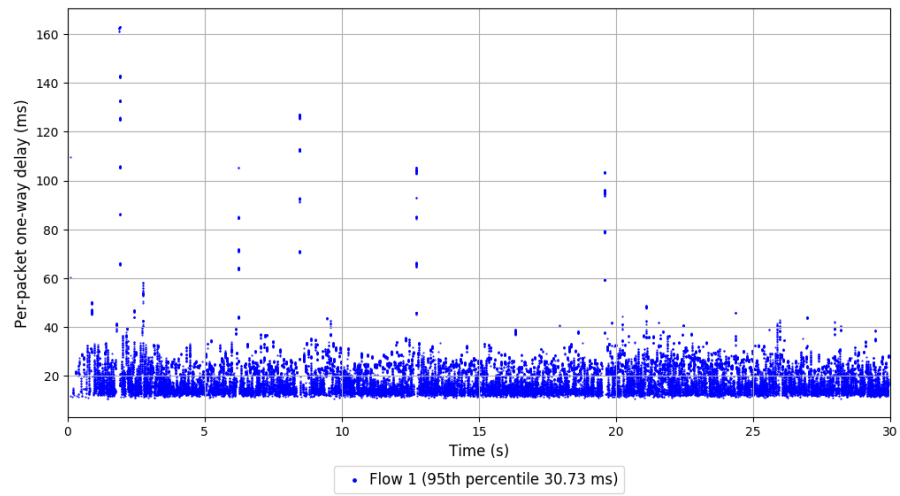

Flow 1 (95th percentile 24.30 ms)

```
Run 1: Statistics of Sprout

Start at: 2017-11-20 22:42:26
End at: 2017-11-20 22:42:56
Local clock offset: -5.484 ms
Remote clock offset: -2.736 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.55 Mbit/s
95th percentile per-packet one-way delay: 31.349 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 15.55 Mbit/s
95th percentile per-packet one-way delay: 31.349 ms
Loss rate: 0.01%
```

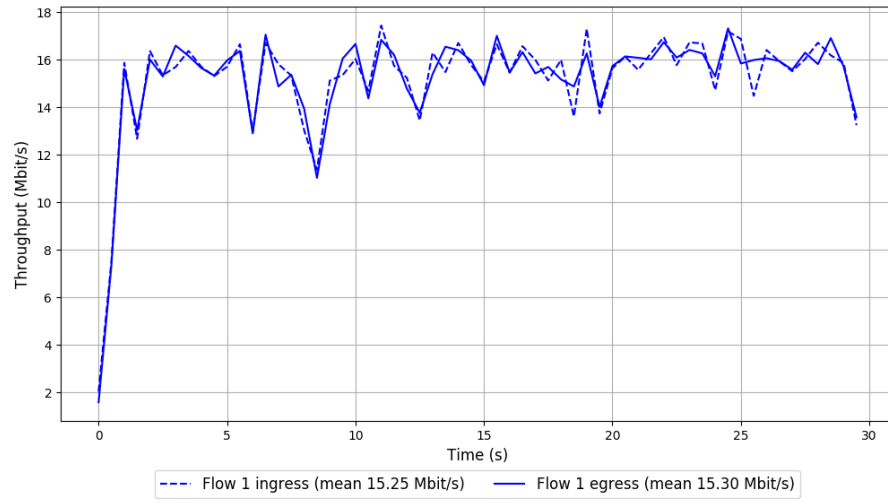Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-11-20 22:59:01
End at: 2017-11-20 22:59:31
Local clock offset: -6.727 ms
Remote clock offset: -2.847 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.30 Mbit/s
95th percentile per-packet one-way delay: 30.733 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 15.30 Mbit/s
95th percentile per-packet one-way delay: 30.733 ms
Loss rate: 0.00%
```
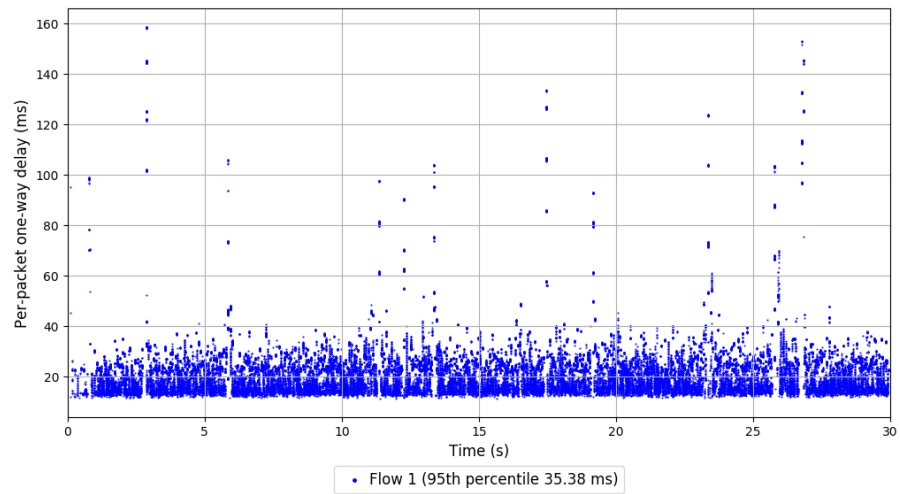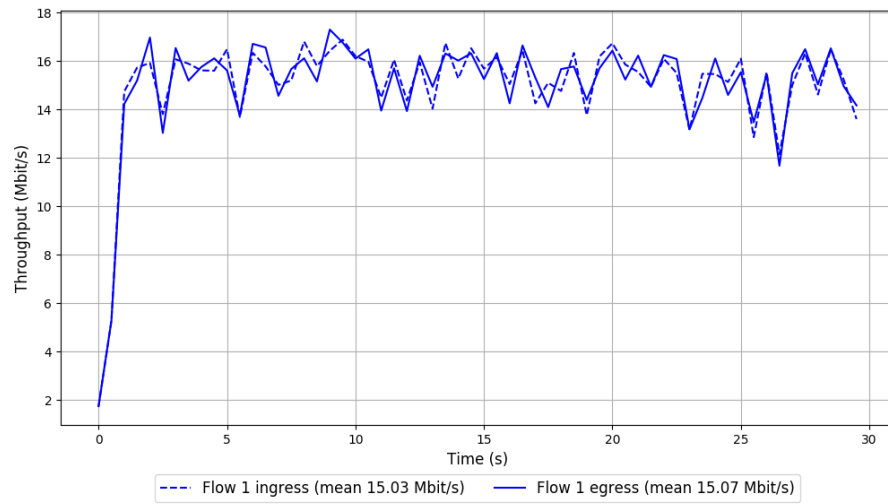
Run 2: Report of Sprout — Data Link

Flow 1 ingress (mean 15.25 Mbit/s) --- Flow 1 egress (mean 15.30 Mbit/s)

Flow 1 (95th percentile 30.73 ms)

```
Run 3: Statistics of Sprout

Start at: 2017-11-20 23:15:36
End at: 2017-11-20 23:16:06
Local clock offset: -6.093 ms
Remote clock offset: -2.73 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.07 Mbit/s
95th percentile per-packet one-way delay: 35.383 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 15.07 Mbit/s
95th percentile per-packet one-way delay: 35.383 ms
Loss rate: 0.00%
```
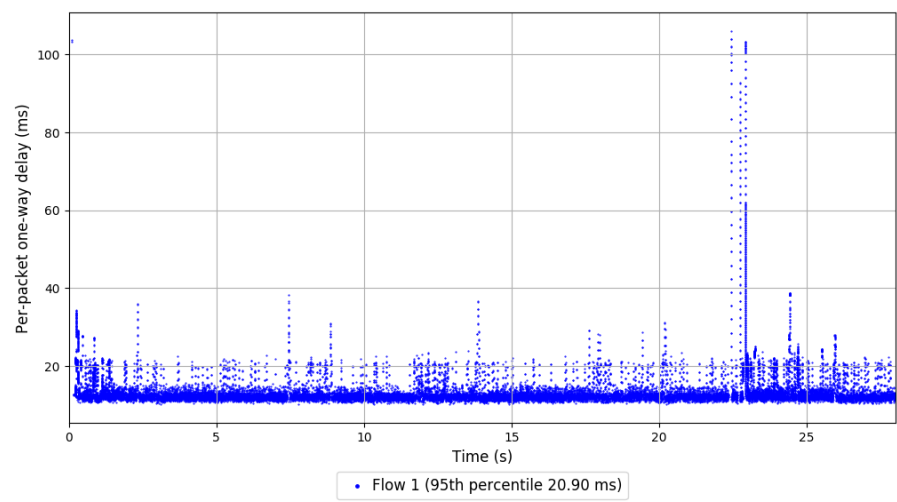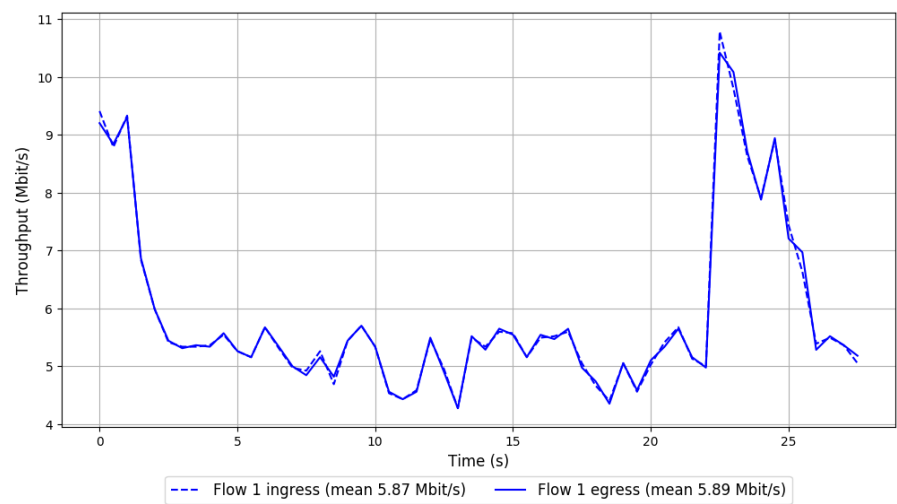
Run 3: Report of Sprout — Data Link

Flow 1 ingress (mean 15.03 Mbit/s)   Flow 1 egress (mean 15.07 Mbit/s)

Flow 1 (95th percentile 35.38 ms)

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

Start at: 2017-11-20 22:43:37
End at: 2017-11-20 22:44:07
Local clock offset: -5.648 ms
Remote clock offset: -2.751 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.89 Mbit/s
95th percentile per-packet one-way delay: 20.899 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.89 Mbit/s
95th percentile per-packet one-way delay: 20.899 ms
Loss rate: 0.00%
```

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

Flow 1 ingress (mean 5.87 Mbit/s)   Flow 1 egress (mean 5.89 Mbit/s)

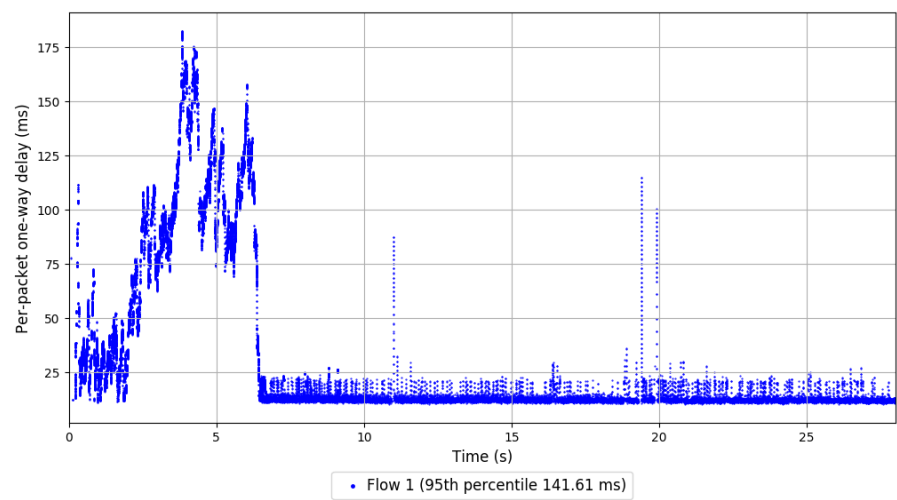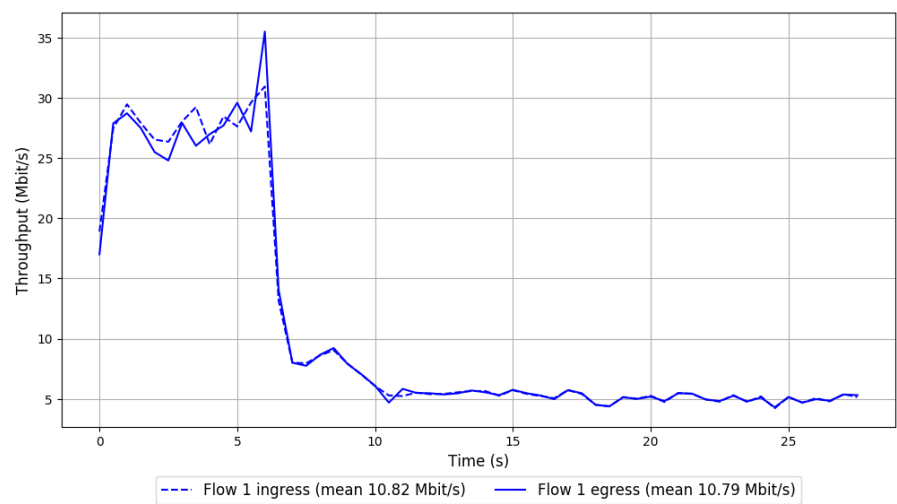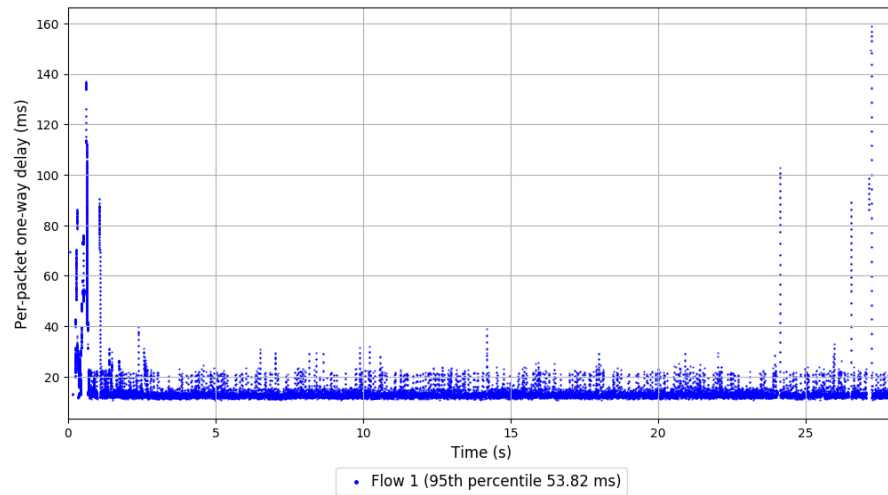Flow 1 (95th percentile 20.90 ms)

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

Start at: 2017-11-20 23:00:11
End at: 2017-11-20 23:00:41
Local clock offset: -6.987 ms
Remote clock offset: -2.856 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.79 Mbit/s
95th percentile per-packet one-way delay: 141.613 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 10.79 Mbit/s
95th percentile per-packet one-way delay: 141.613 ms
Loss rate: 0.55%
```

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

Flow 1 ingress (mean 10.82 Mbit/s) — Flow 1 egress (mean 10.79 Mbit/s)
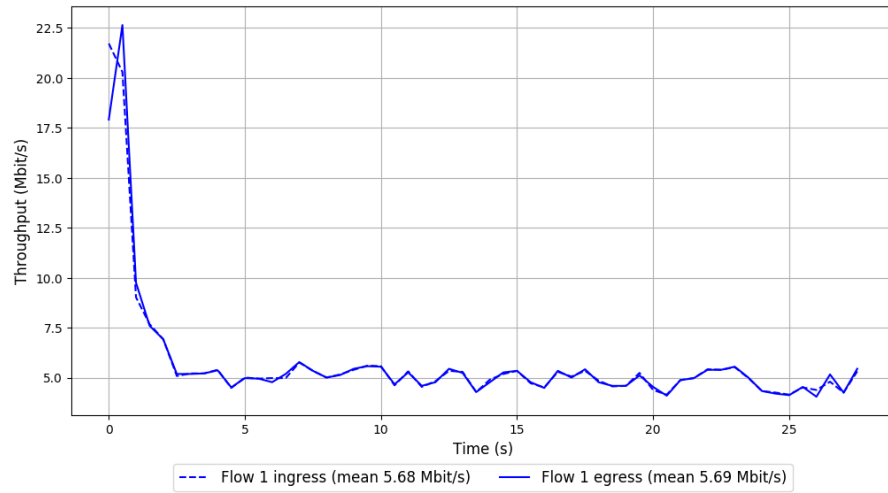

• Flow 1 (95th percentile 141.61 ms)

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

Start at: 2017-11-20 23:16:47
End at: 2017-11-20 23:17:17
Local clock offset: -5.474 ms
Remote clock offset: -2.676 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.69 Mbit/s
95th percentile per-packet one-way delay: 53.824 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 5.69 Mbit/s
95th percentile per-packet one-way delay: 53.824 ms
Loss rate: 0.19%
```
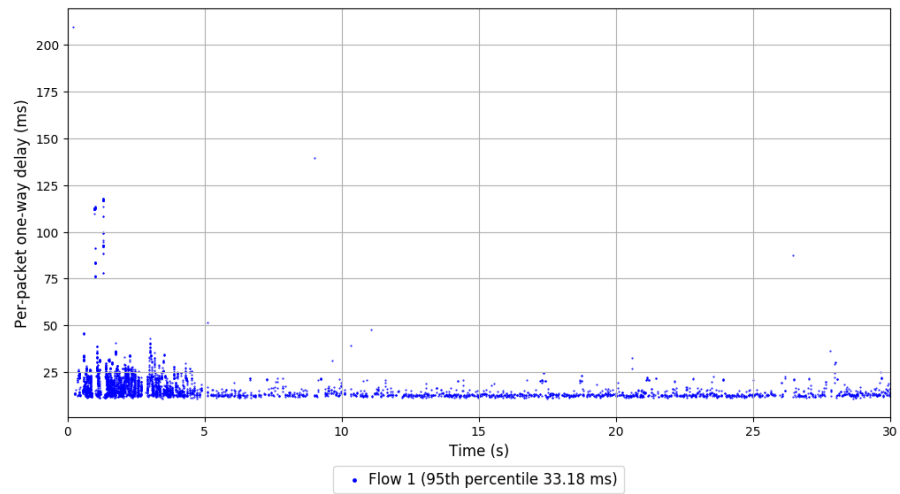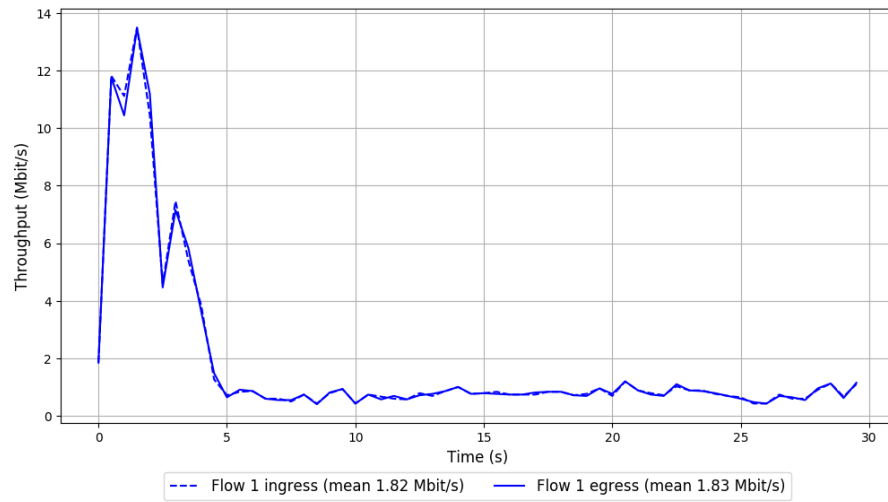
Run 3: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 5.68 Mbit/s) --- Flow 1 egress (mean 5.69 Mbit/s)
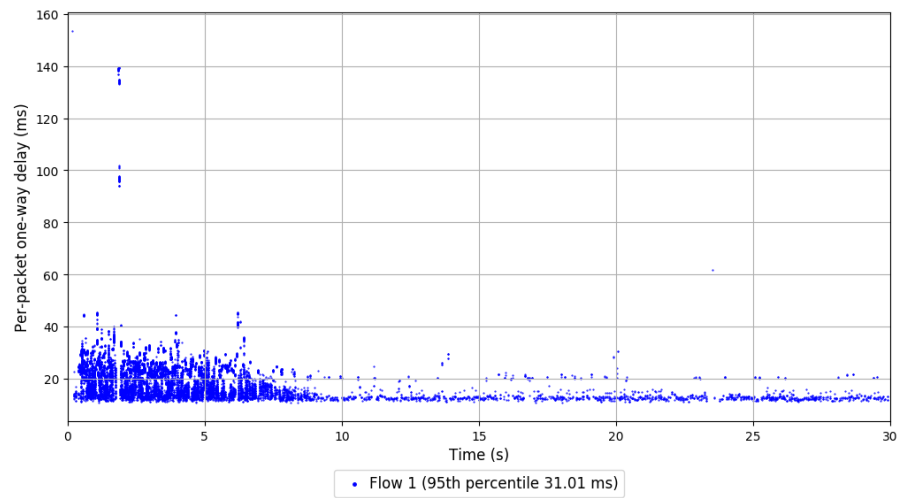

Flow 1 (95th percentile 53.82 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2017-11-20 22:31:47
End at: 2017-11-20 22:32:17
Local clock offset: -4.998 ms
Remote clock offset: -2.68 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 33.179 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.83 Mbit/s
95th percentile per-packet one-way delay: 33.179 ms
Loss rate: 0.00%
```

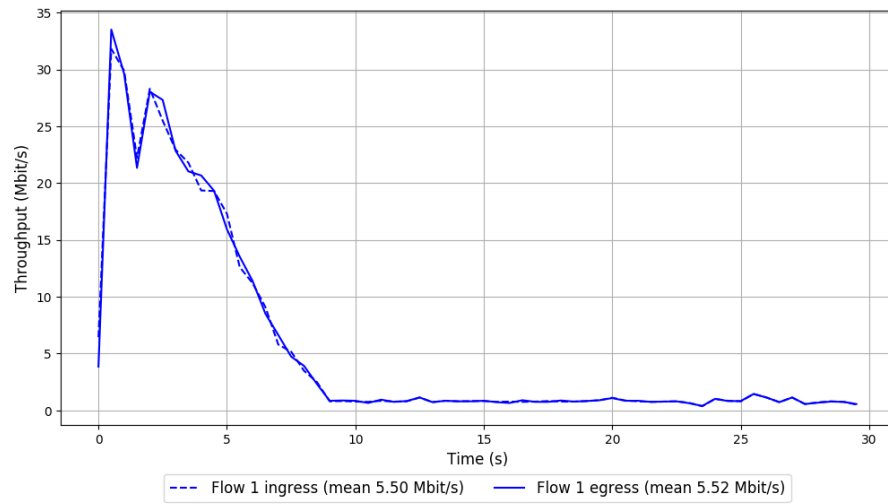Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-11-20 22:48:20
End at: 2017-11-20 22:48:50
Local clock offset: -6.326 ms
Remote clock offset: -2.793 ms

# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.52 Mbit/s
95th percentile per-packet one-way delay: 31.012 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 5.52 Mbit/s
95th percentile per-packet one-way delay: 31.012 ms
Loss rate: 0.00%
```

Run 2: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 5.50 Mbit/s) ——— Flow 1 egress (mean 5.52 Mbit/s)

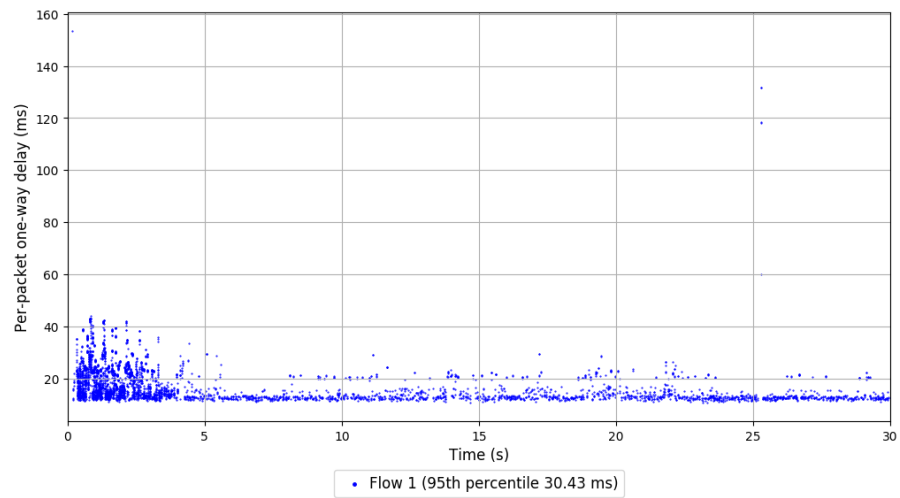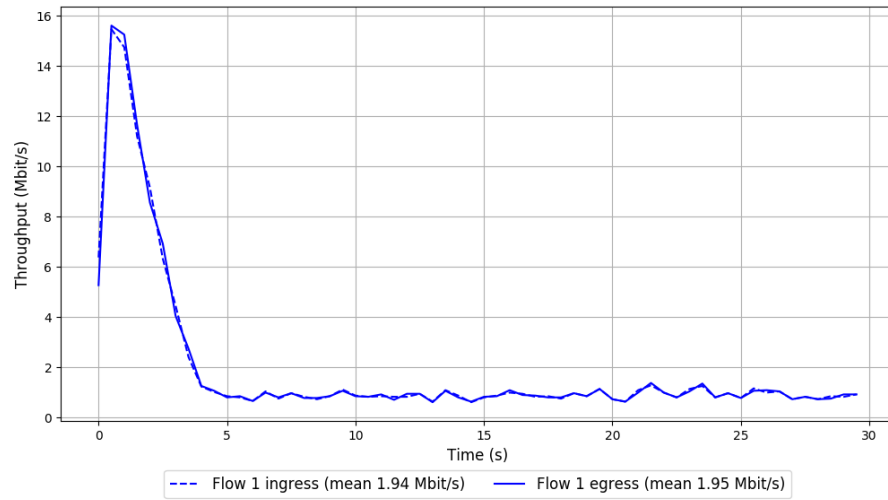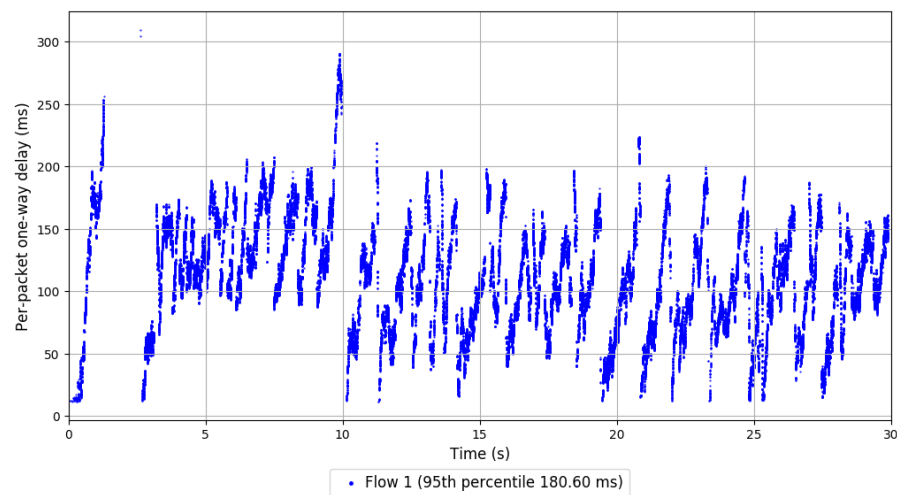• Flow 1 (95th percentile 31.01 ms)

```
Run 3: Statistics of TCP Vegas

Start at: 2017-11-20 23:04:56
End at: 2017-11-20 23:05:26
Local clock offset: -7.563 ms
Remote clock offset: -2.887 ms


# Below is generated by plot.py at 2017-11-20 23:22:13
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 30.428 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 30.428 ms
Loss rate: 0.00%
```

Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.94 Mbit/s) --- Flow 1 egress (mean 1.95 Mbit/s)

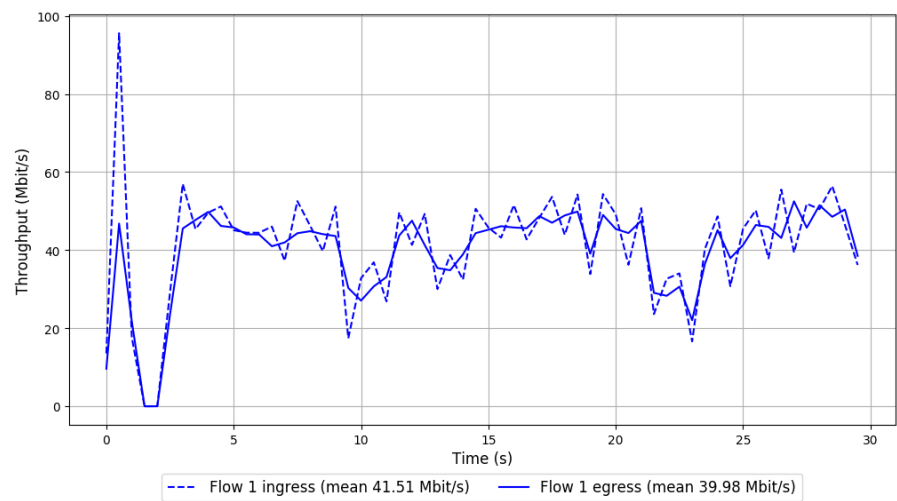Flow 1 (95th percentile 30.43 ms)

```
Run 1: Statistics of Verus

Start at: 2017-11-20 22:32:57
End at: 2017-11-20 22:33:27
Local clock offset: -5.055 ms
Remote clock offset: -2.669 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 39.98 Mbit/s
95th percentile per-packet one-way delay: 180.605 ms
Loss rate: 3.56%
-- Flow 1:
Average throughput: 39.98 Mbit/s
95th percentile per-packet one-way delay: 180.605 ms
Loss rate: 3.56%
```

Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2017-11-20 22:49:30
End at: 2017-11-20 22:50:00
Local clock offset: -6.375 ms
Remote clock offset: -2.75 ms


# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 32.09 Mbit/s
95th percentile per-packet one-way delay: 228.587 ms
Loss rate: 3.48%
-- Flow 1:
Average throughput: 32.09 Mbit/s
95th percentile per-packet one-way delay: 228.587 ms
Loss rate: 3.48%
```
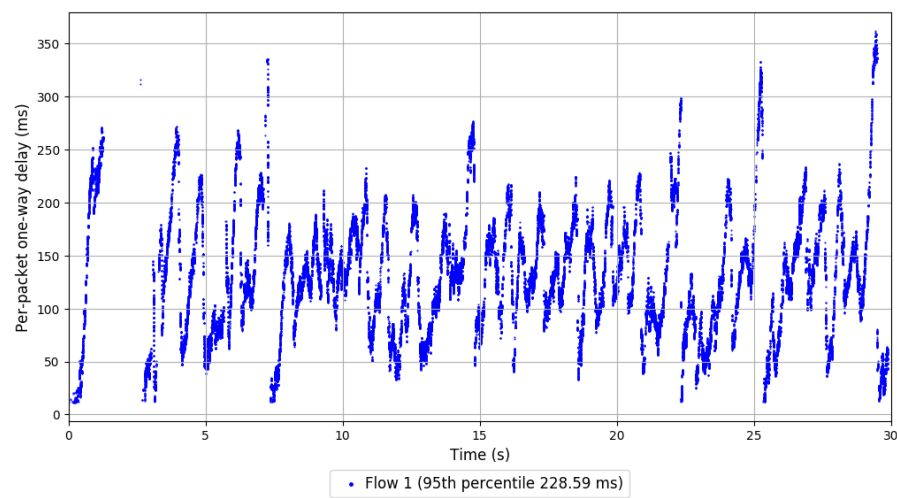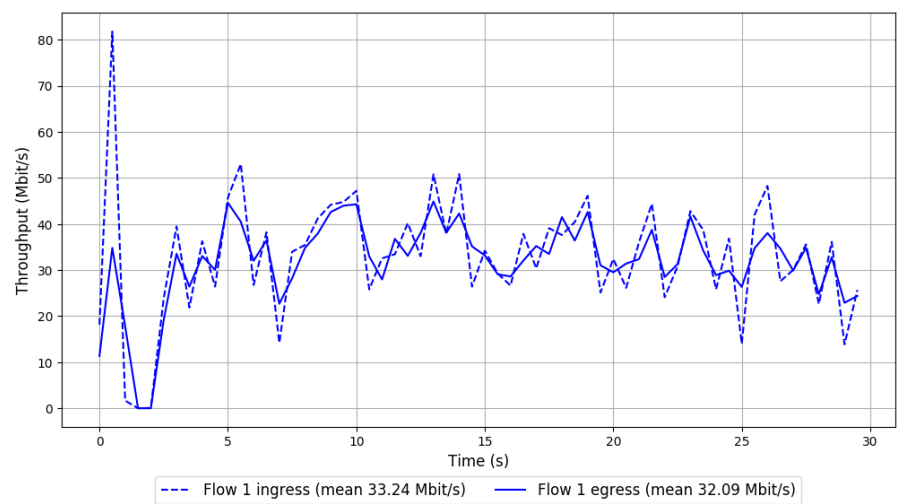
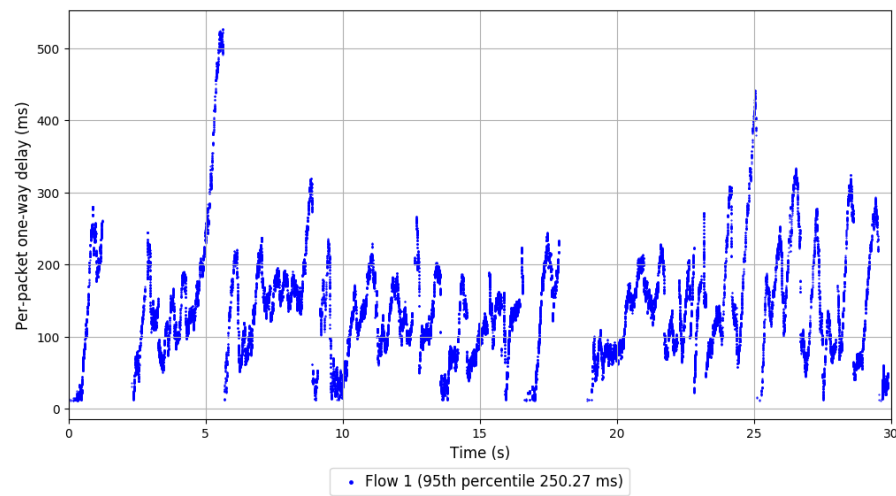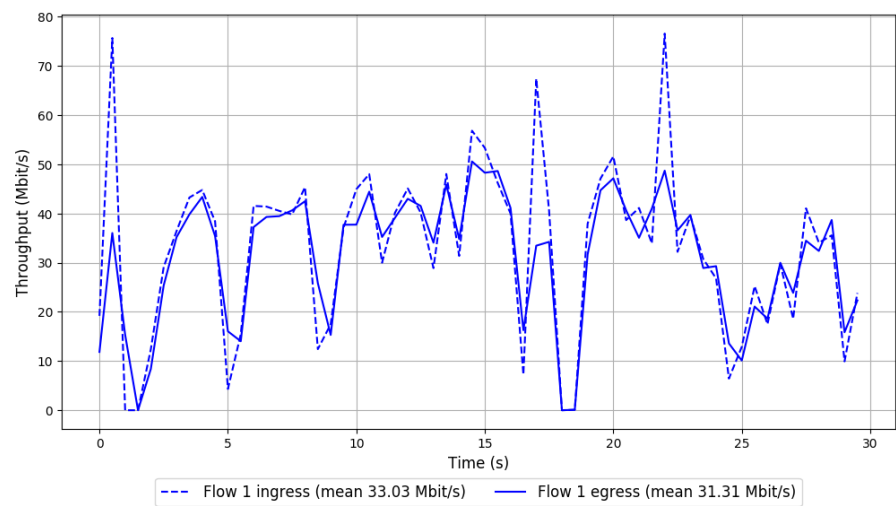Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2017-11-20 23:06:06
End at: 2017-11-20 23:06:36
Local clock offset: -7.762 ms
Remote clock offset: -2.852 ms


# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 31.31 Mbit/s
95th percentile per-packet one-way delay: 250.273 ms
Loss rate: 5.18%
-- Flow 1:
Average throughput: 31.31 Mbit/s
95th percentile per-packet one-way delay: 250.273 ms
Loss rate: 5.18%
```
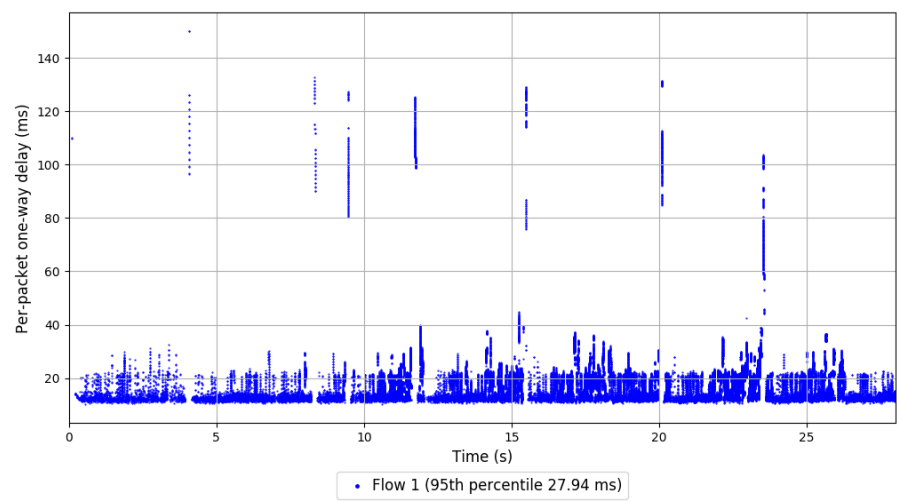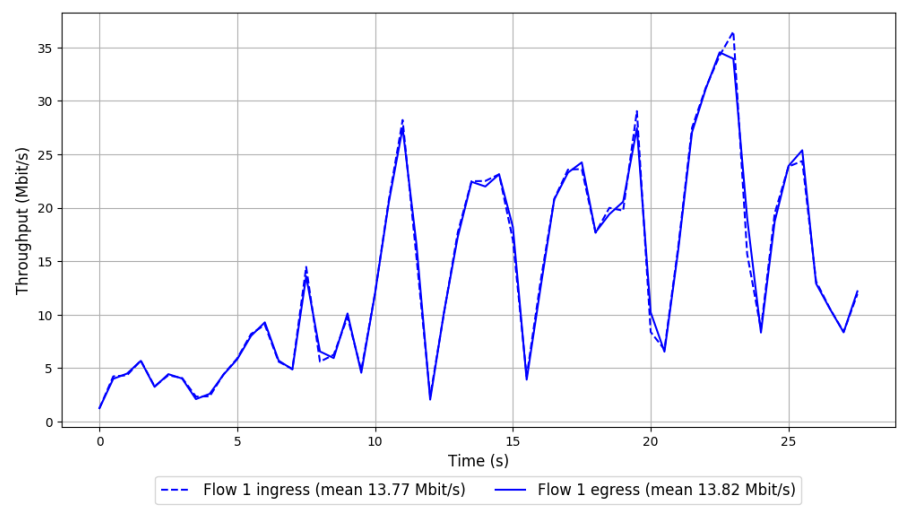
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of Copa

Start at: 2017-11-20 22:41:14
End at: 2017-11-20 22:41:44
Local clock offset: -5.381 ms
Remote clock offset: -2.738 ms


# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.82 Mbit/s
95th percentile per-packet one-way delay: 27.944 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 13.82 Mbit/s
95th percentile per-packet one-way delay: 27.944 ms
Loss rate: 0.00%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 13.77 Mbit/s)　　Flow 1 egress (mean 13.82 Mbit/s)
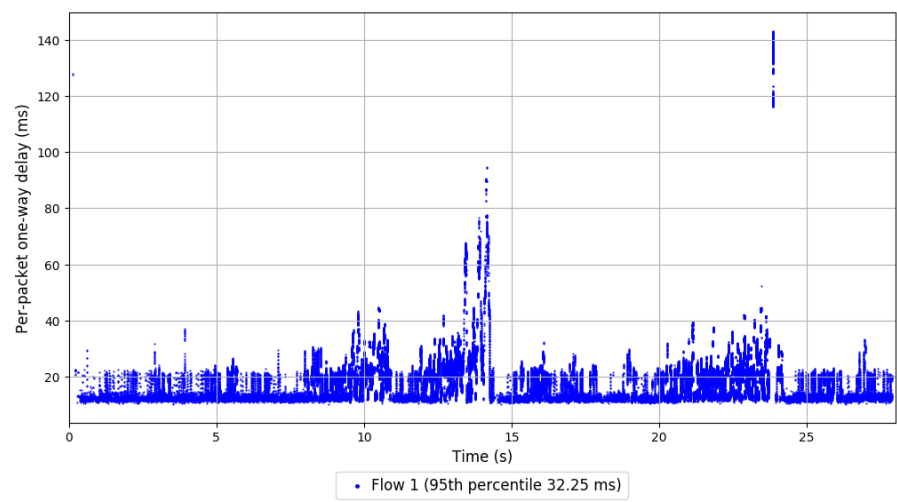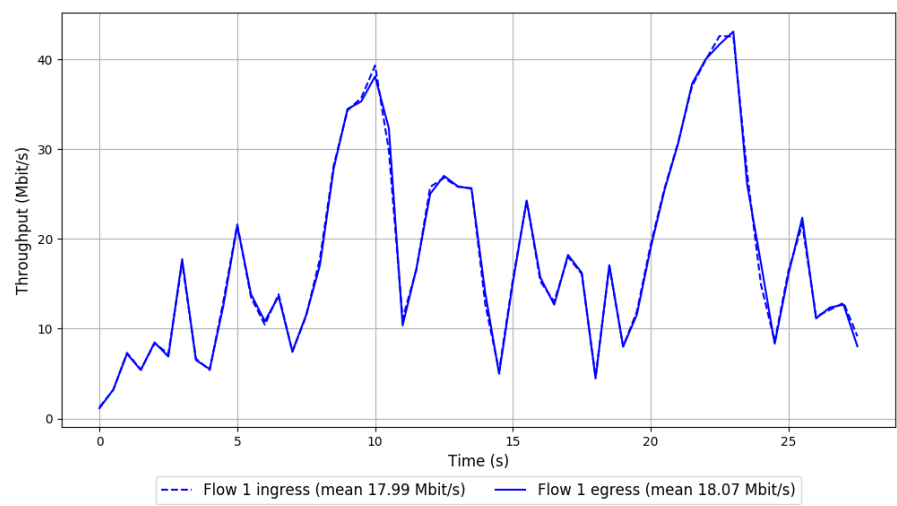

Flow 1 (95th percentile 27.94 ms)

```
Run 2: Statistics of Copa

Start at: 2017-11-20 22:57:49
End at: 2017-11-20 22:58:19
Local clock offset: -6.636 ms
Remote clock offset: -2.821 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 18.07 Mbit/s
95th percentile per-packet one-way delay: 32.246 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 18.07 Mbit/s
95th percentile per-packet one-way delay: 32.246 ms
Loss rate: 0.13%
```

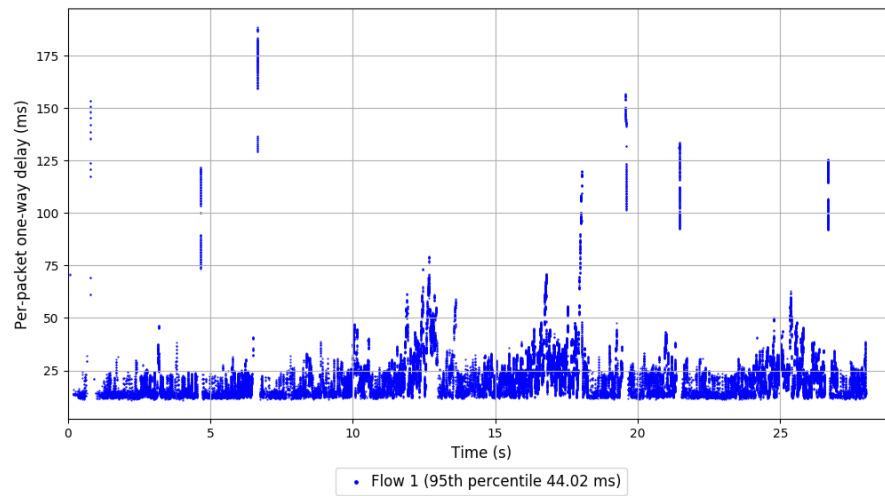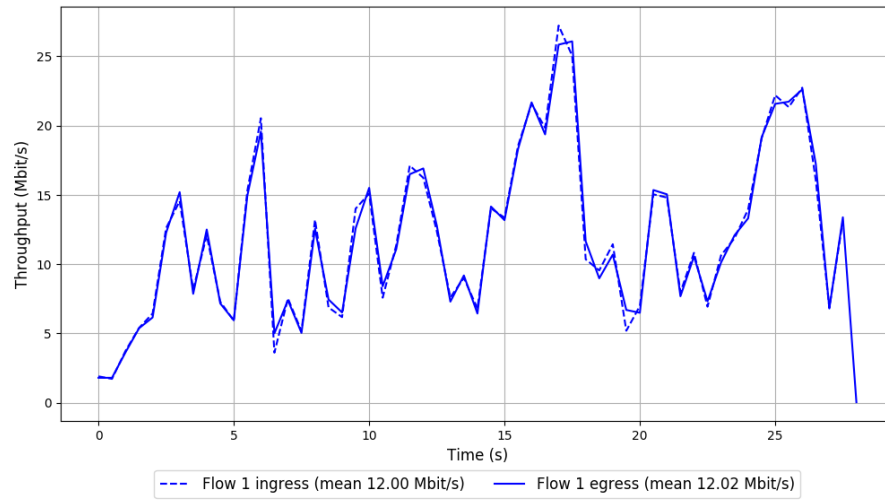Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2017-11-20 23:14:25
End at: 2017-11-20 23:14:55
Local clock offset: -6.855 ms
Remote clock offset: -2.755 ms


# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.02 Mbit/s
95th percentile per-packet one-way delay: 44.017 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 12.02 Mbit/s
95th percentile per-packet one-way delay: 44.017 ms
Loss rate: 0.00%
```

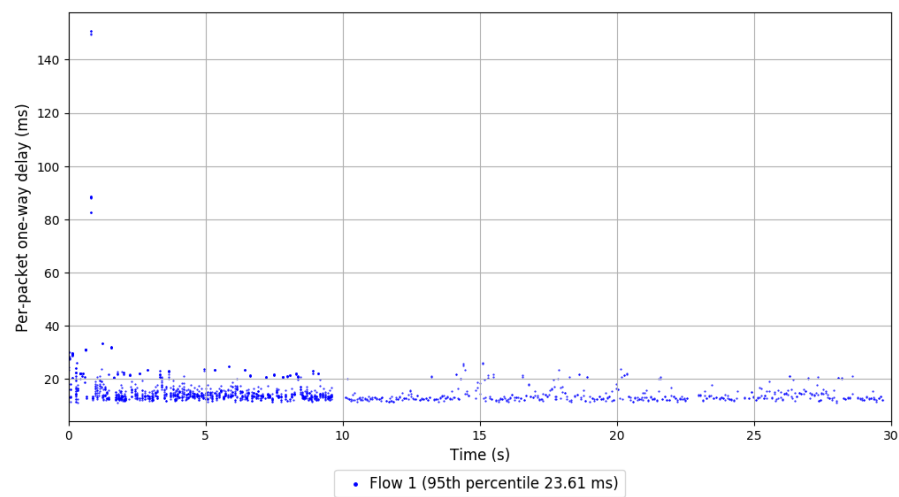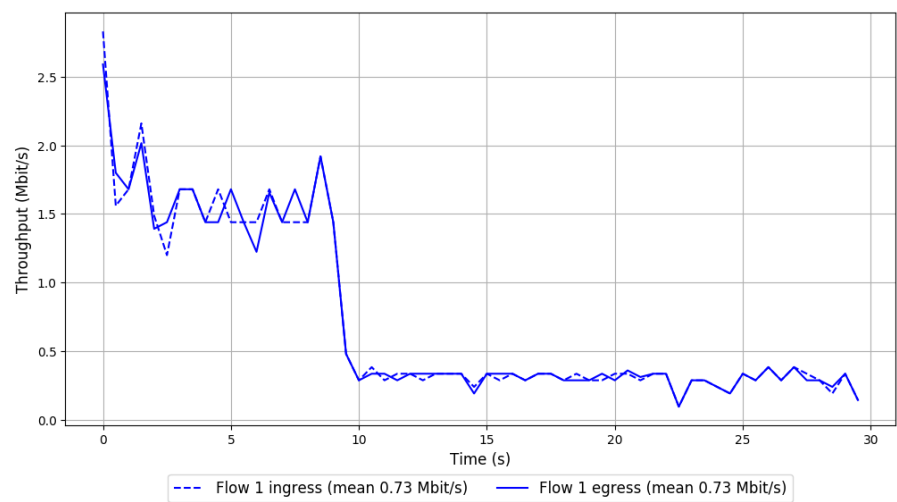Run 3: Report of Copa — Data Link

```
Run 1: Statistics of Indigo

Start at: 2017-11-20 22:37:42
End at: 2017-11-20 22:38:12
Local clock offset: -5.167 ms
Remote clock offset: -2.711 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 23.611 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 23.611 ms
Loss rate: 0.00%
```

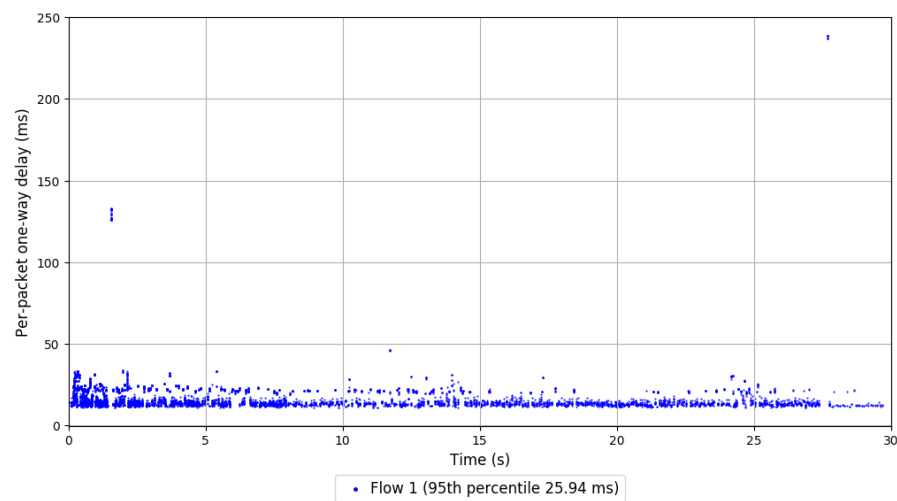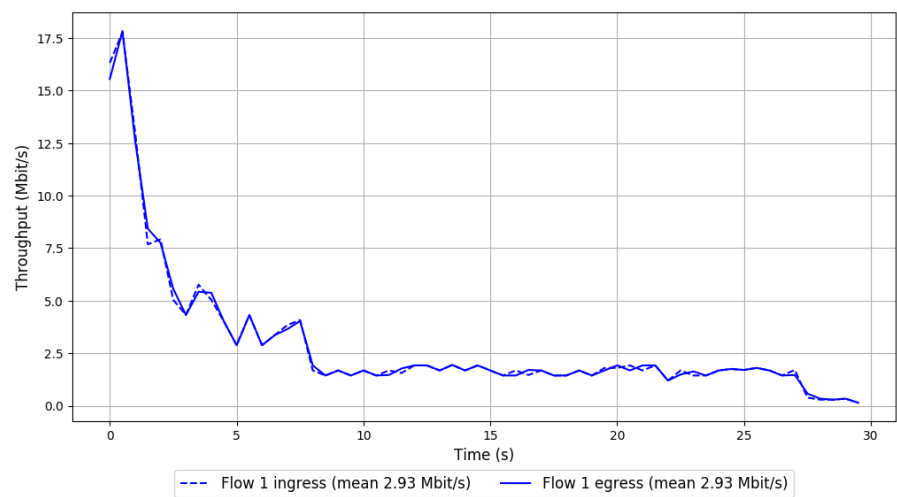Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-11-20 22:54:17
End at: 2017-11-20 22:54:47
Local clock offset: -6.391 ms
Remote clock offset: -2.831 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.93 Mbit/s
95th percentile per-packet one-way delay: 25.936 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.93 Mbit/s
95th percentile per-packet one-way delay: 25.936 ms
Loss rate: 0.00%
```

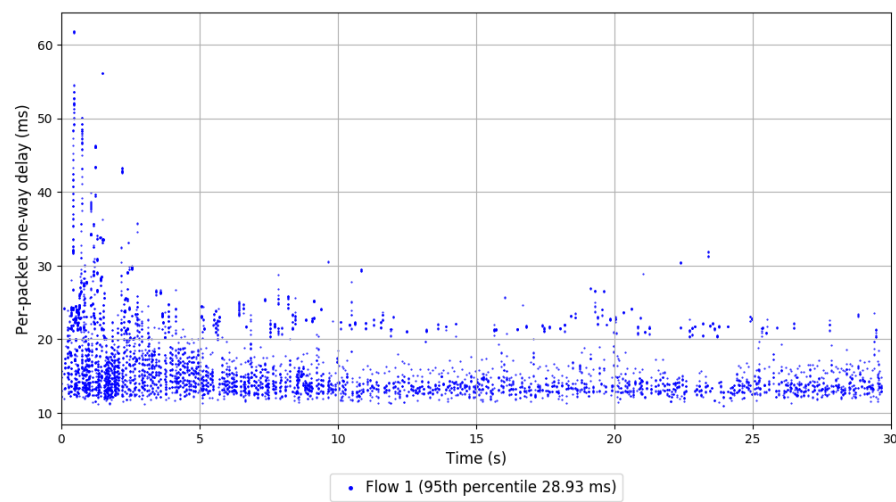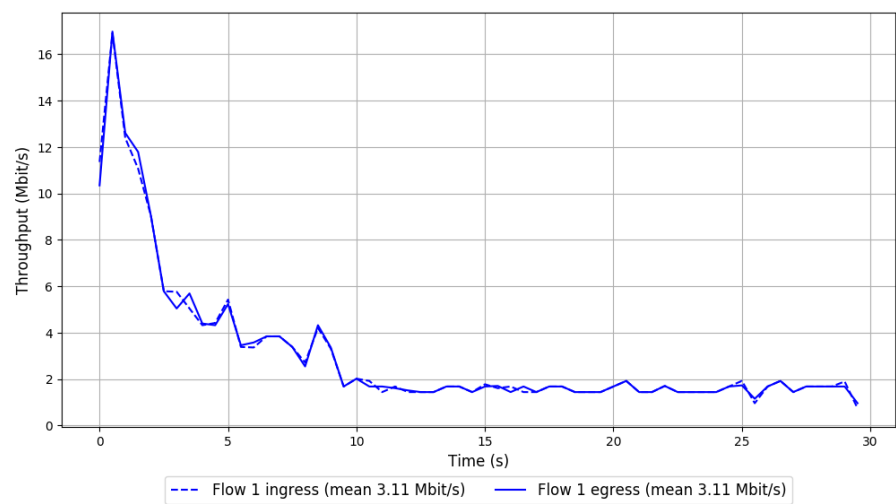Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2017-11-20 23:10:52
End at: 2017-11-20 23:11:22
Local clock offset: -8.507 ms
Remote clock offset: -2.807 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.11 Mbit/s
95th percentile per-packet one-way delay: 28.928 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.11 Mbit/s
95th percentile per-packet one-way delay: 28.928 ms
Loss rate: 0.00%
```
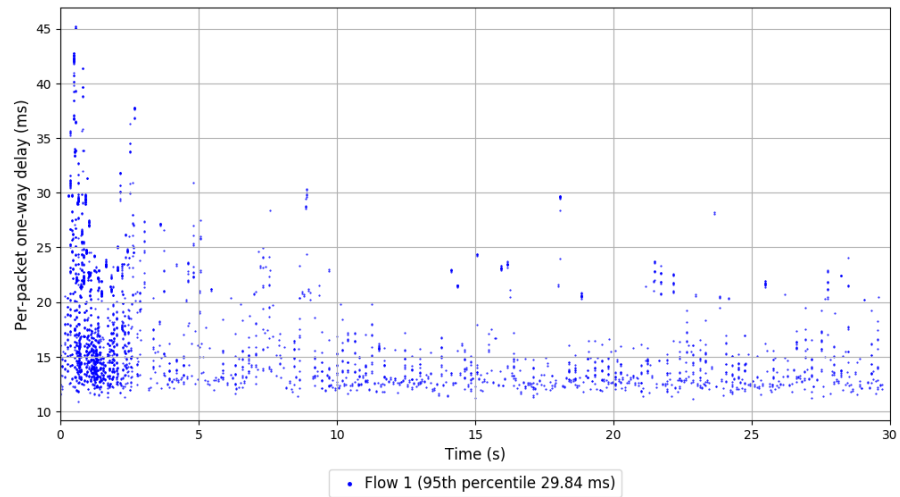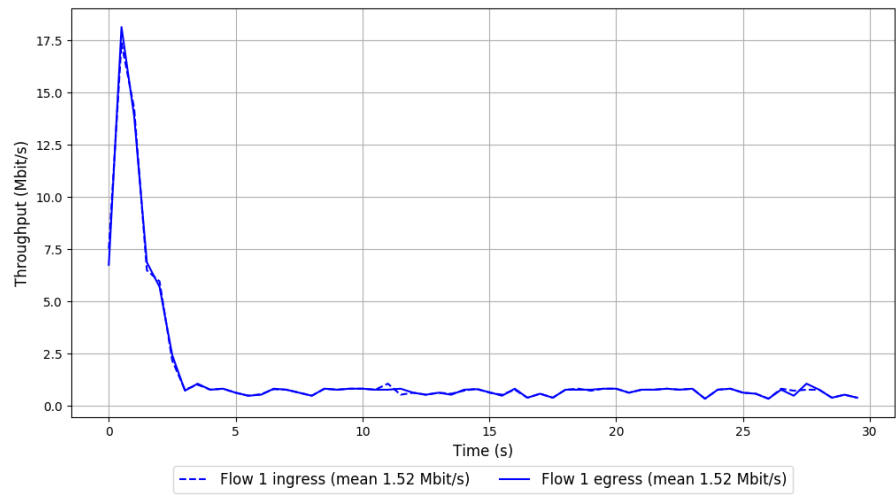
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of Indigo-calib

Start at: 2017-11-20 22:34:10
End at: 2017-11-20 22:34:40
Local clock offset: -5.048 ms
Remote clock offset: -2.695 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 29.844 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 29.844 ms
Loss rate: 0.00%
```

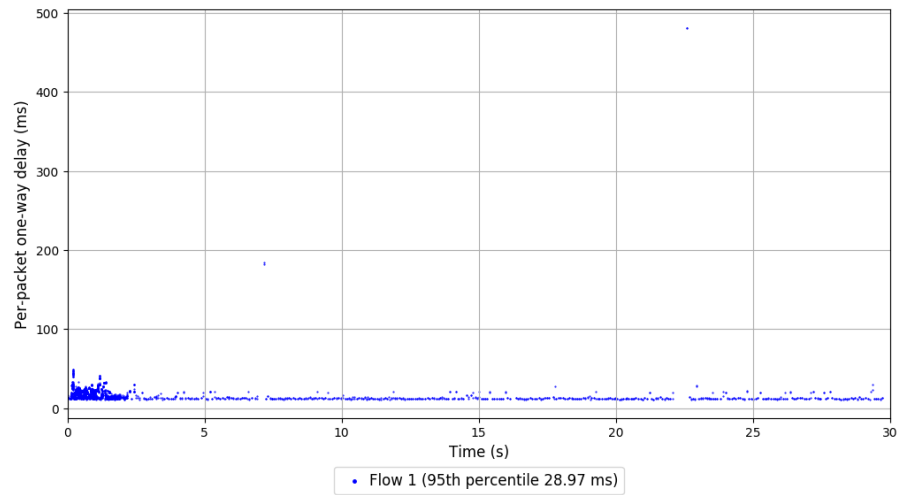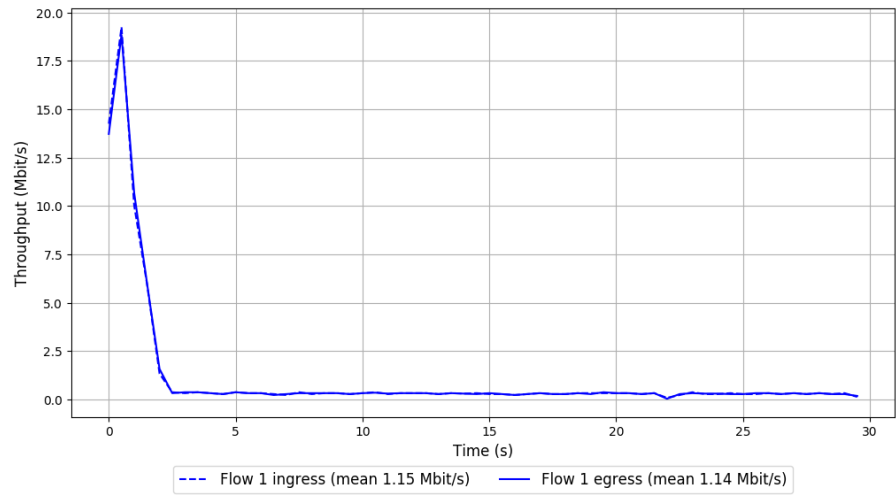Run 1: Report of Indigo-calib — Data Link

```
Run 2: Statistics of Indigo-calib

Start at: 2017-11-20 22:50:42
End at: 2017-11-20 22:51:12
Local clock offset: -6.359 ms
Remote clock offset: -2.807 ms


# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 28.971 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 28.971 ms
Loss rate: 0.00%
```

Run 2: Report of Indigo-calib — Data Link

```
Run 3: Statistics of Indigo-calib

Start at: 2017-11-20 23:07:18
End at: 2017-11-20 23:07:48
Local clock offset: -7.851 ms
Remote clock offset: -2.834 ms

# Below is generated by plot.py at 2017-11-20 23:22:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 33.227 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 33.227 ms
Loss rate: 0.00%
```

Run 3: Report of Indigo-calib — Data Link