Pantheon Report

Generated at 2017-11-30 06:56:17 (UTC).

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

Repeated the test of 14 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

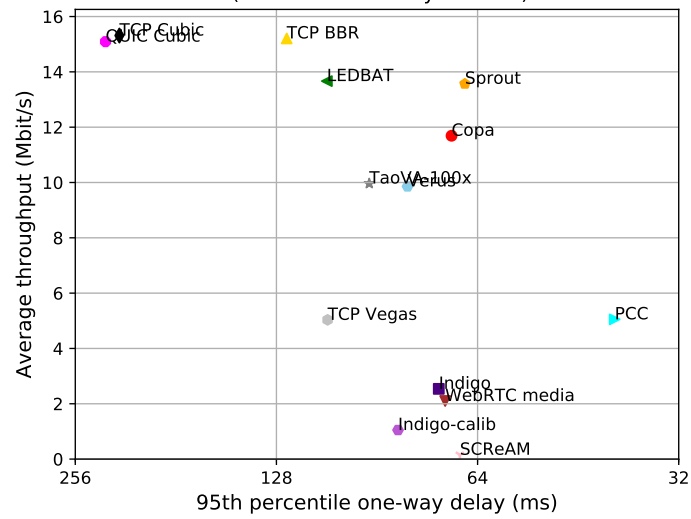Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

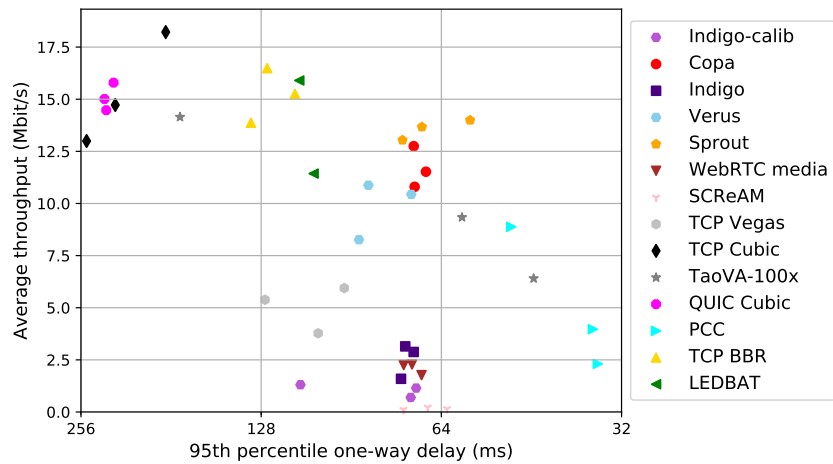NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

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

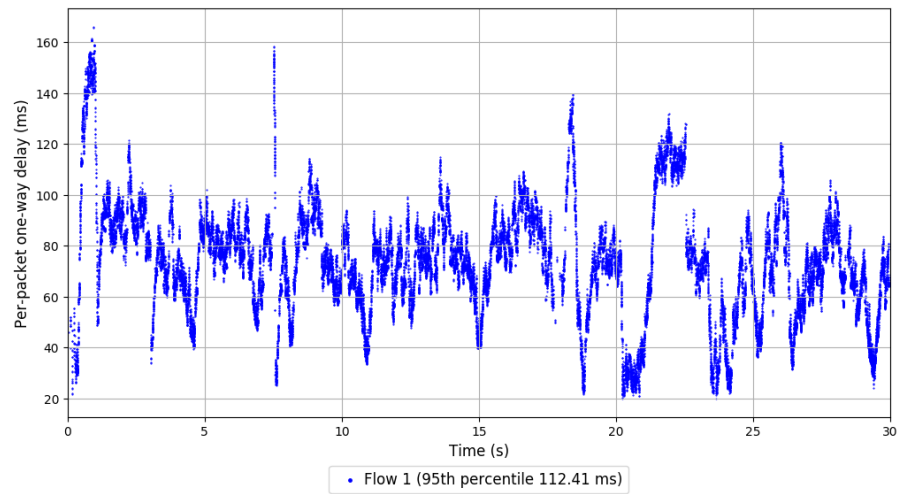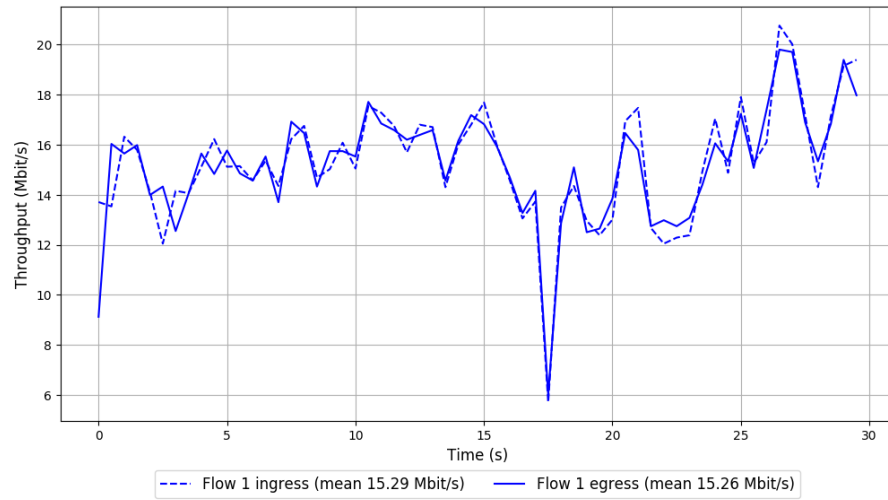## test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme

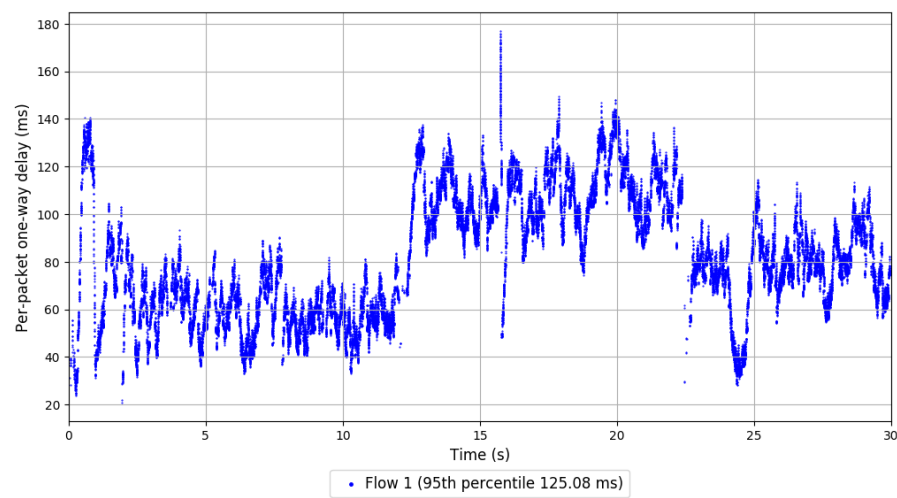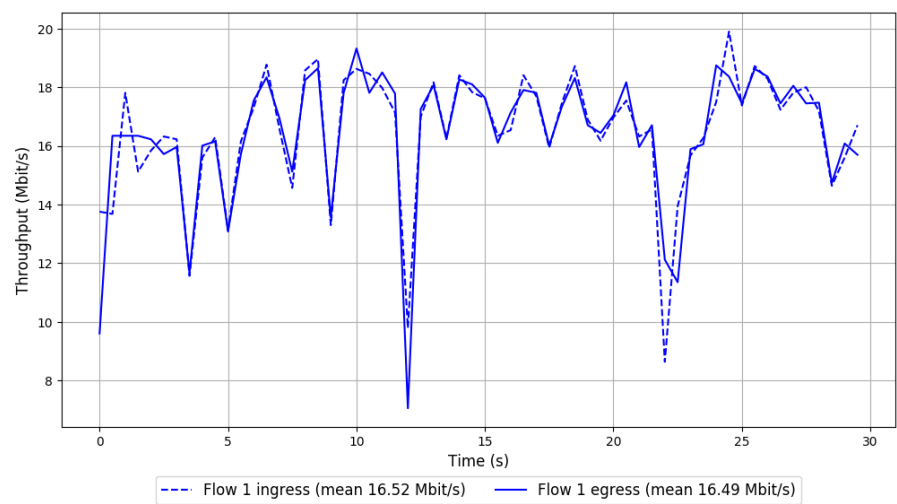| scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	15.21	123.54	0.35
TCP Cubic	3	15.31	219.88	0.82
LEDBAT	2	13.66	107.59	0.44
PCC	3	5.05	39.90	0.72
QUIC Cubic	3	15.09	230.65	1.09
SCReAM	3	0.16	68.03	0.25
WebRTC media	3	2.10	71.56	0.11
Sprout	3	13.57	66.86	1.11
TaoVA-100x	3	9.96	92.96	0.36
TCP Vegas	3	5.03	107.31	0.07
Verus	3	9.86	81.48	14.62
Copa	3	11.69	70.01	0.34
Indigo	3	2.54	73.16	0.19
Indigo-calib	3	1.05	84.19	0.41

```
Run 1: Statistics of TCP BBR

Start at: 2017-11-30 05:28:13
End at: 2017-11-30 05:28:43
Local clock offset: -1.516 ms
Remote clock offset: -4.199 ms


# Below is generated by plot.py at 2017-11-30 06:55:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.26 Mbit/s
95th percentile per-packet one-way delay: 112.410 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 15.26 Mbit/s
95th percentile per-packet one-way delay: 112.410 ms
Loss rate: 0.38%
```
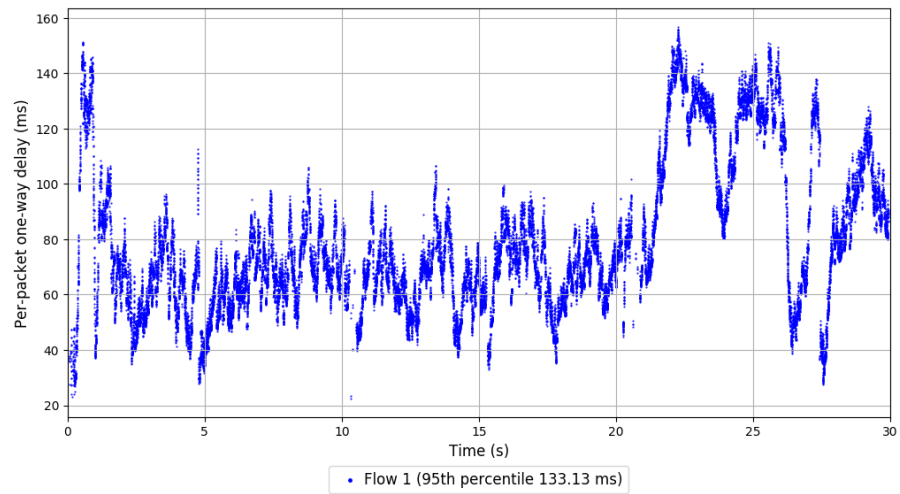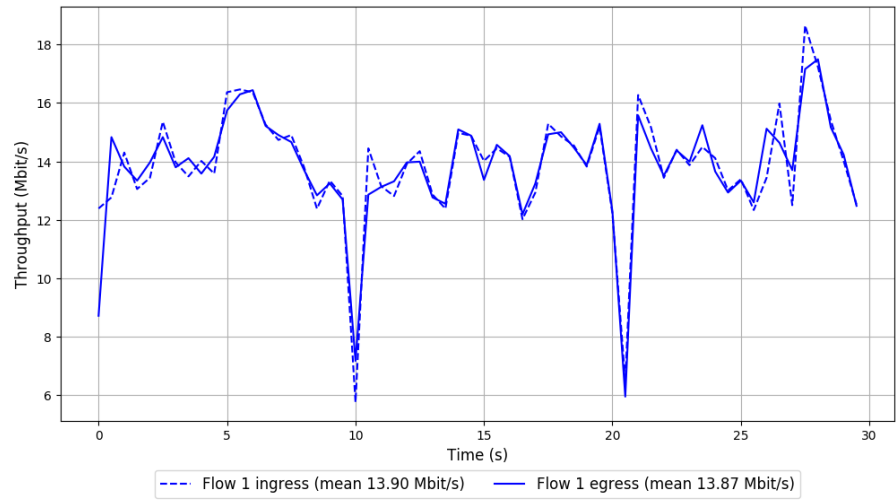
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-11-30 05:44:41
End at: 2017-11-30 05:45:11
Local clock offset: -0.412 ms
Remote clock offset: -4.124 ms


# Below is generated by plot.py at 2017-11-30 06:55:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 16.49 Mbit/s
95th percentile per-packet one-way delay: 125.081 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 16.49 Mbit/s
95th percentile per-packet one-way delay: 125.081 ms
Loss rate: 0.32%
```
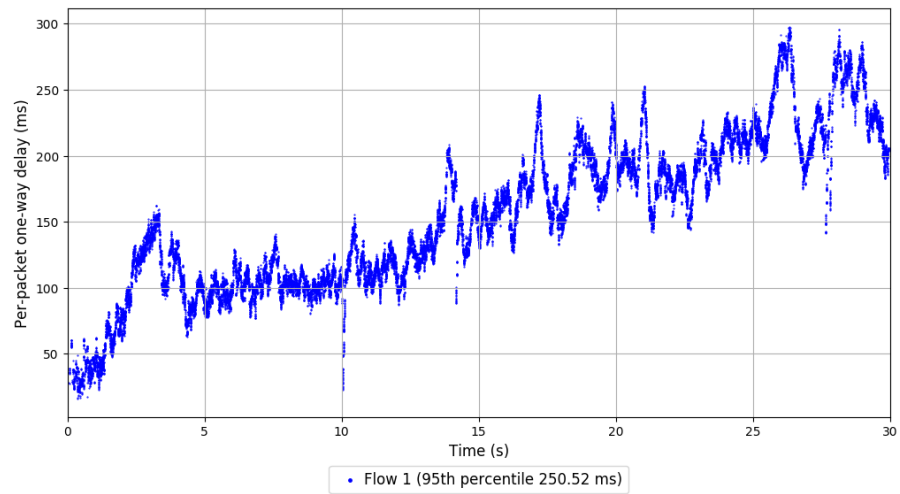
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2017-11-30 06:01:10
End at: 2017-11-30 06:01:40
Local clock offset: -0.601 ms
Remote clock offset: -3.903 ms


# Below is generated by plot.py at 2017-11-30 06:55:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.87 Mbit/s
95th percentile per-packet one-way delay: 133.132 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 13.87 Mbit/s
95th percentile per-packet one-way delay: 133.132 ms
Loss rate: 0.35%
```

Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 13.90 Mbit/s)   Flow 1 egress (mean 13.87 Mbit/s)

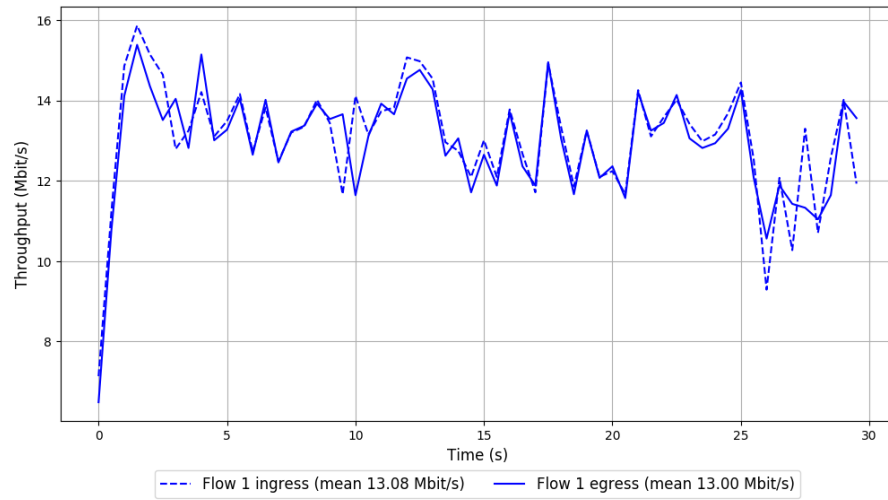Flow 1 (95th percentile 133.13 ms)

9

```
Run 1: Statistics of TCP Cubic

Start at: 2017-11-30 05:21:08
End at: 2017-11-30 05:21:38
Local clock offset: -1.98 ms
Remote clock offset: -4.151 ms

# Below is generated by plot.py at 2017-11-30 06:55:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.00 Mbit/s
95th percentile per-packet one-way delay: 250.517 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 13.00 Mbit/s
95th percentile per-packet one-way delay: 250.517 ms
Loss rate: 0.82%
```
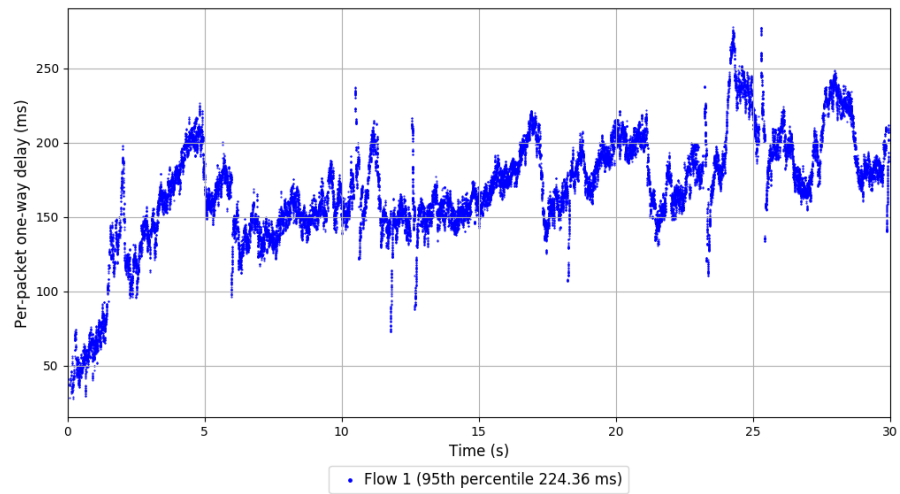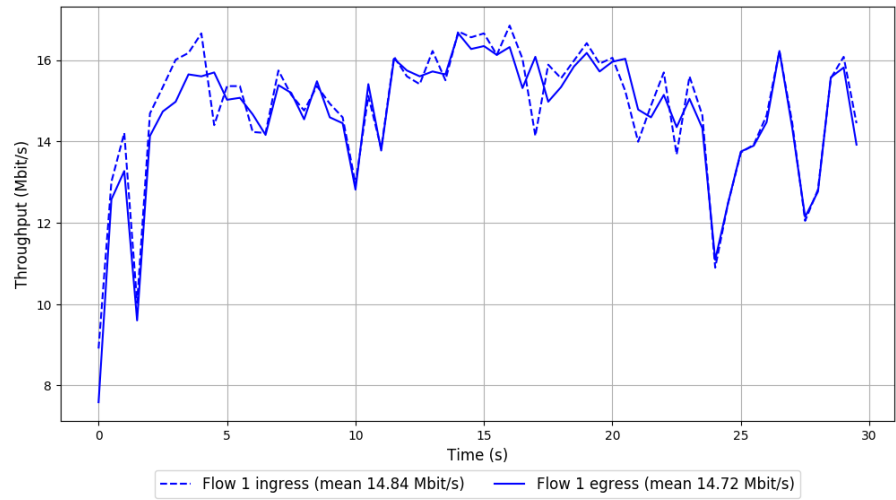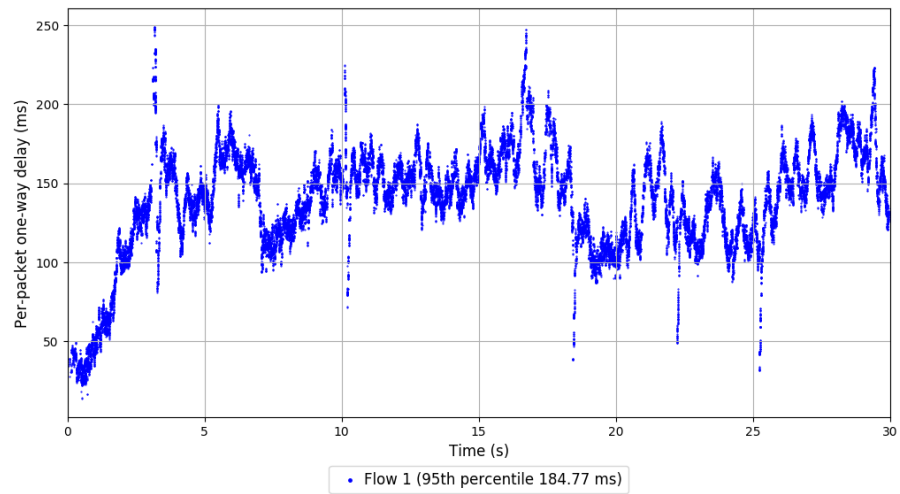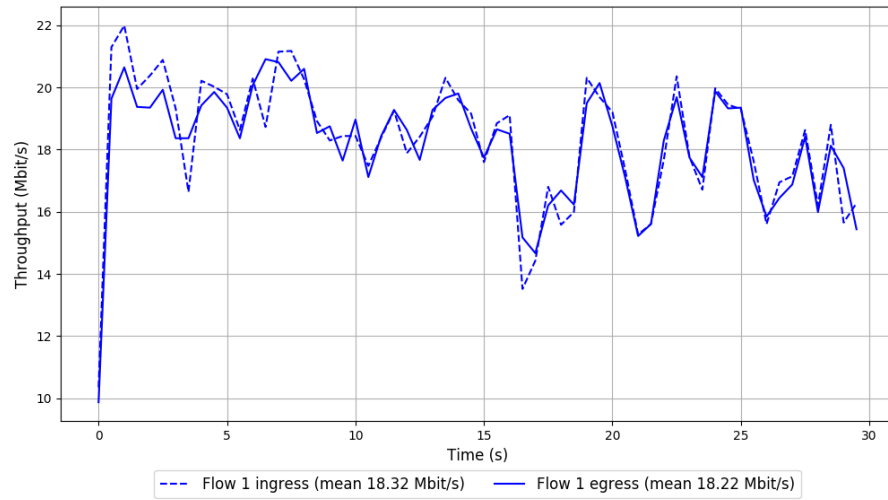
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 13.08 Mbit/s) ----- Flow 1 egress (mean 13.00 Mbit/s)

Flow 1 (95th percentile 250.52 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2017-11-30 05:37:38
End at: 2017-11-30 05:38:08
Local clock offset: -0.541 ms
Remote clock offset: -4.16 ms

# Below is generated by plot.py at 2017-11-30 06:55:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 14.72 Mbit/s
95th percentile per-packet one-way delay: 224.364 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 14.72 Mbit/s
95th percentile per-packet one-way delay: 224.364 ms
Loss rate: 0.98%
```
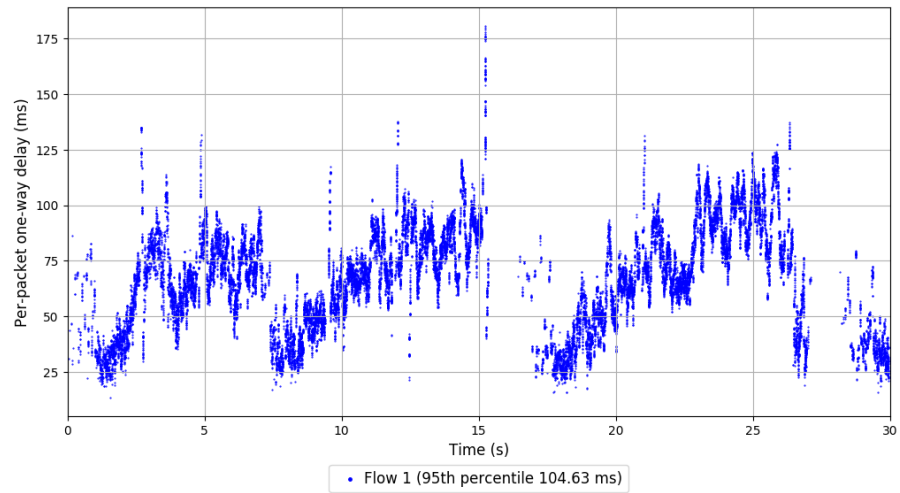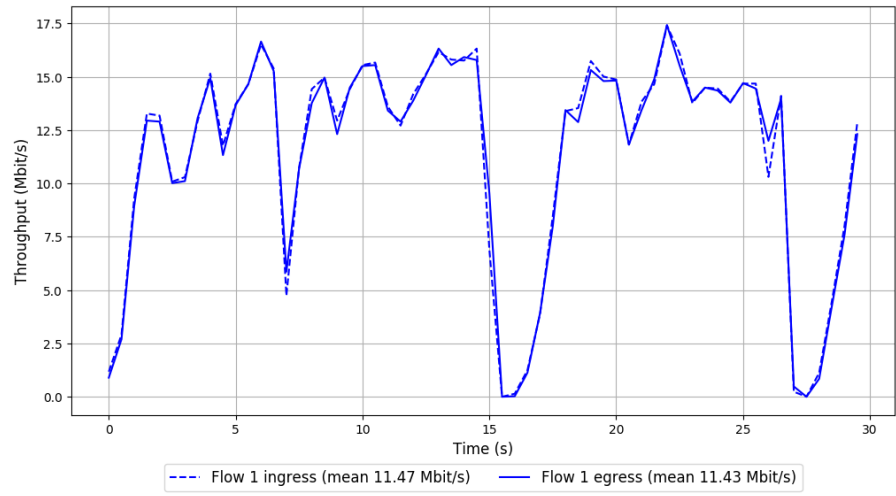
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-11-30 05:54:06
End at: 2017-11-30 05:54:36
Local clock offset: -0.799 ms
Remote clock offset: -4.037 ms


# Below is generated by plot.py at 2017-11-30 06:55:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 18.22 Mbit/s
95th percentile per-packet one-way delay: 184.774 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 18.22 Mbit/s
95th percentile per-packet one-way delay: 184.774 ms
Loss rate: 0.67%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 18.32 Mbit/s)   Flow 1 egress (mean 18.22 Mbit/s)

Flow 1 (95th percentile 184.77 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2017-11-30 05:24:40
End at: 2017-11-30 05:25:10
Local clock offset: -2.34 ms
Remote clock offset: -4.218 ms


# Below is generated by plot.py at 2017-11-30 06:55:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 104.626 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 11.43 Mbit/s
95th percentile per-packet one-way delay: 104.626 ms
Loss rate: 0.48%
```

Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 11.47 Mbit/s) ---- Flow 1 egress (mean 11.43 Mbit/s)

• Flow 1 (95th percentile 104.63 ms)

Run 2: Statistics of LEDBAT

Start at: 2017-11-30 05:41:10
End at: 2017-11-30 05:41:40
Local clock offset: -0.367 ms
Remote clock offset: -4.131 ms
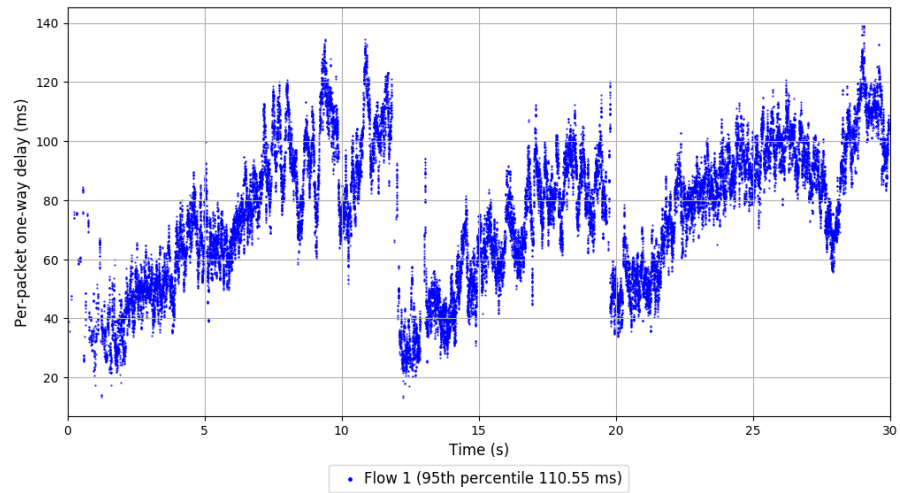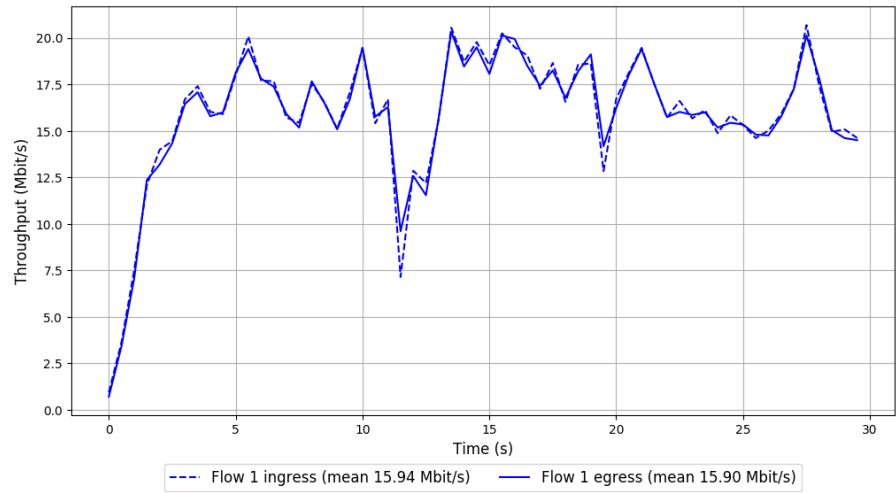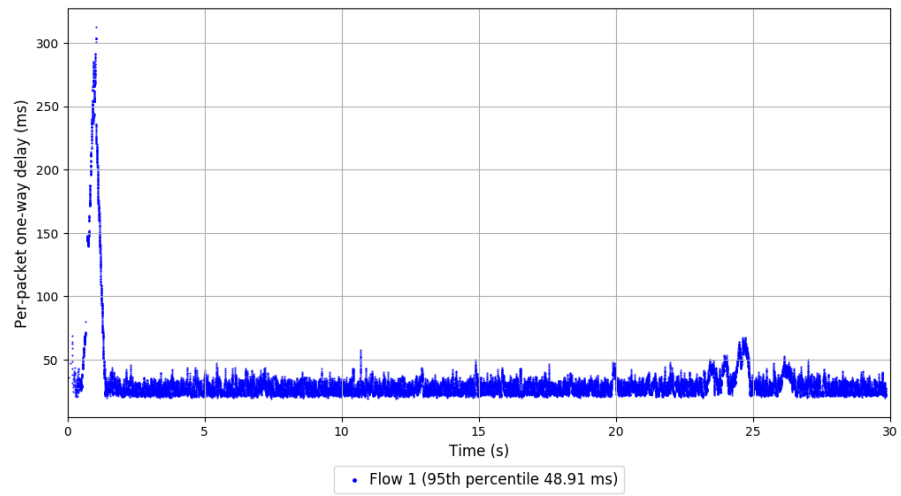
Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2017-11-30 05:57:38
End at: 2017-11-30 05:58:08
Local clock offset: -0.755 ms
Remote clock offset: -3.919 ms


# Below is generated by plot.py at 2017-11-30 06:55:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.90 Mbit/s
95th percentile per-packet one-way delay: 110.553 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 15.90 Mbit/s
95th percentile per-packet one-way delay: 110.553 ms
Loss rate: 0.41%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 15.94 Mbit/s) --- Flow 1 egress (mean 15.90 Mbit/s)

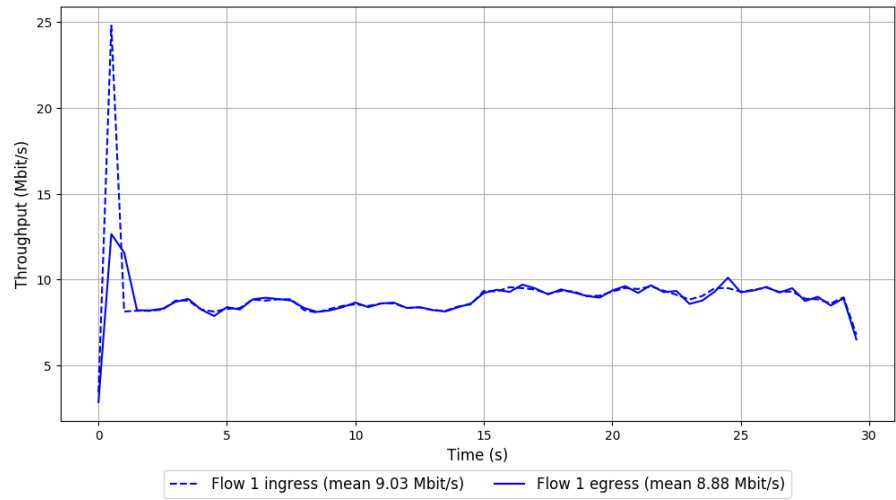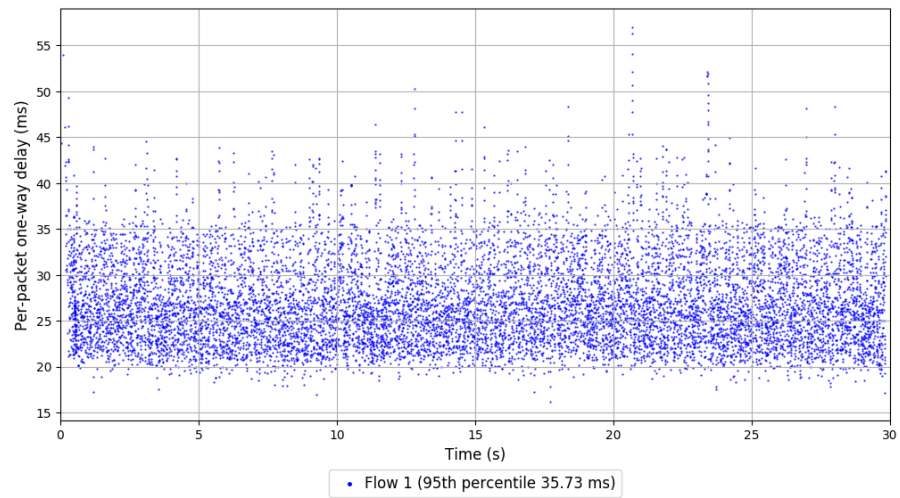Flow 1 (95th percentile 110.55 ms)

```
Run 1: Statistics of PCC

Start at: 2017-11-30 05:17:36
End at: 2017-11-30 05:18:06
Local clock offset: -2.029 ms
Remote clock offset: -4.225 ms


# Below is generated by plot.py at 2017-11-30 06:55:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.88 Mbit/s
95th percentile per-packet one-way delay: 48.906 ms
Loss rate: 1.79%
-- Flow 1:
Average throughput: 8.88 Mbit/s
95th percentile per-packet one-way delay: 48.906 ms
Loss rate: 1.79%
```

Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 9.03 Mbit/s)   Flow 1 egress (mean 8.88 Mbit/s)
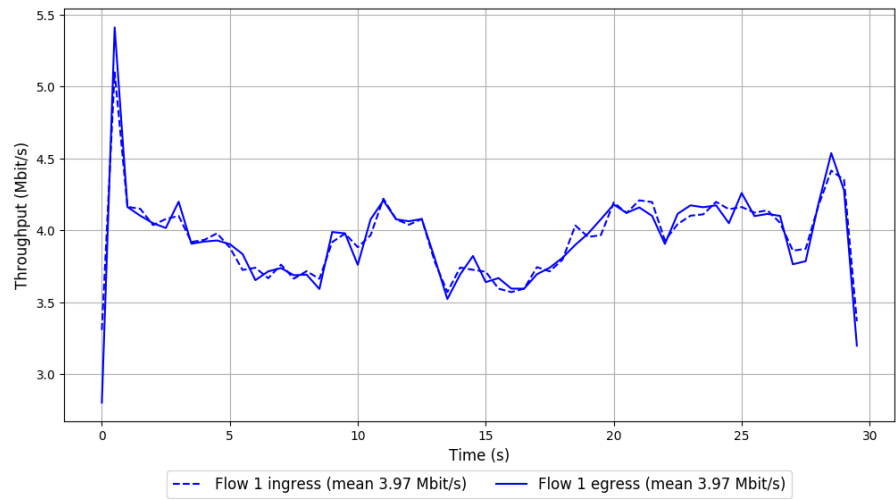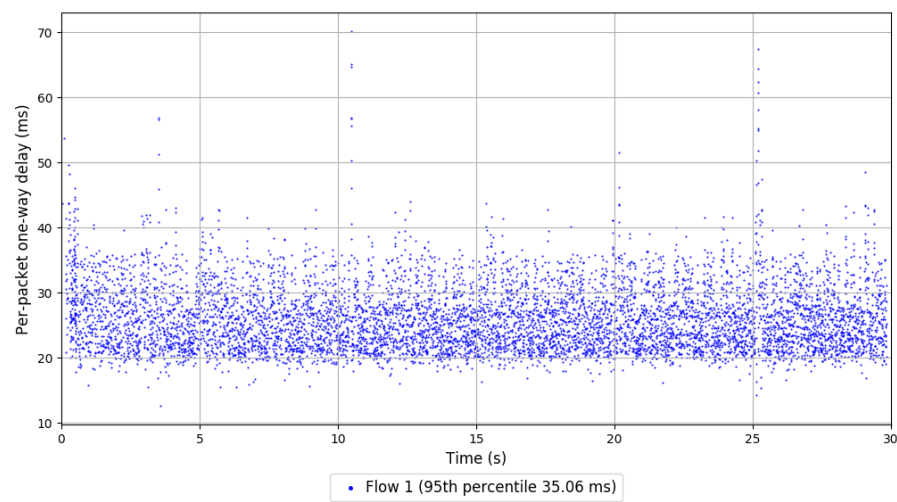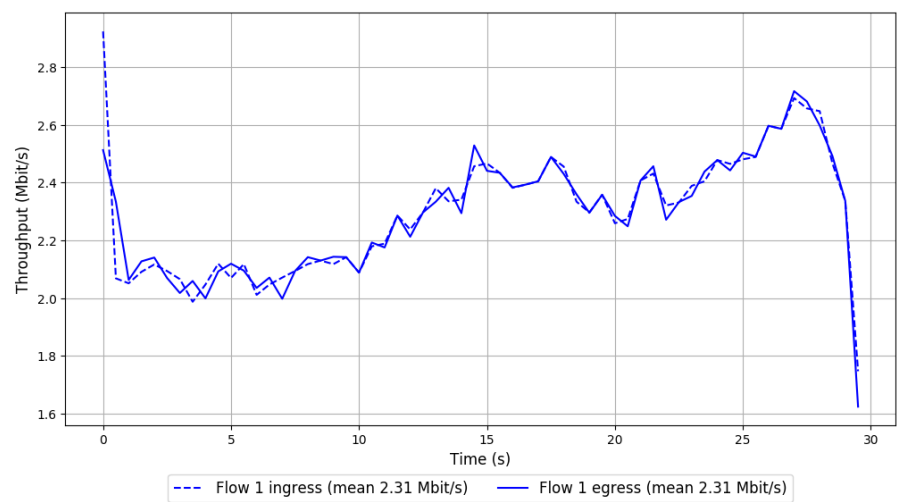

Flow 1 (95th percentile 48.91 ms)

```
Run 2: Statistics of PCC

Start at: 2017-11-30 05:34:06
End at: 2017-11-30 05:34:36
Local clock offset: -1.332 ms
Remote clock offset: -4.196 ms


# Below is generated by plot.py at 2017-11-30 06:55:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 35.729 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 35.729 ms
Loss rate: 0.19%
```

Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 3.97 Mbit/s) --- Flow 1 egress (mean 3.97 Mbit/s)

Flow 1 (95th percentile 35.73 ms)

```
Run 3: Statistics of PCC

Start at: 2017-11-30 05:50:34
End at: 2017-11-30 05:51:04
Local clock offset: -0.649 ms
Remote clock offset: -4.031 ms


# Below is generated by plot.py at 2017-11-30 06:55:36
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 35.059 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 35.059 ms
Loss rate: 0.18%
```
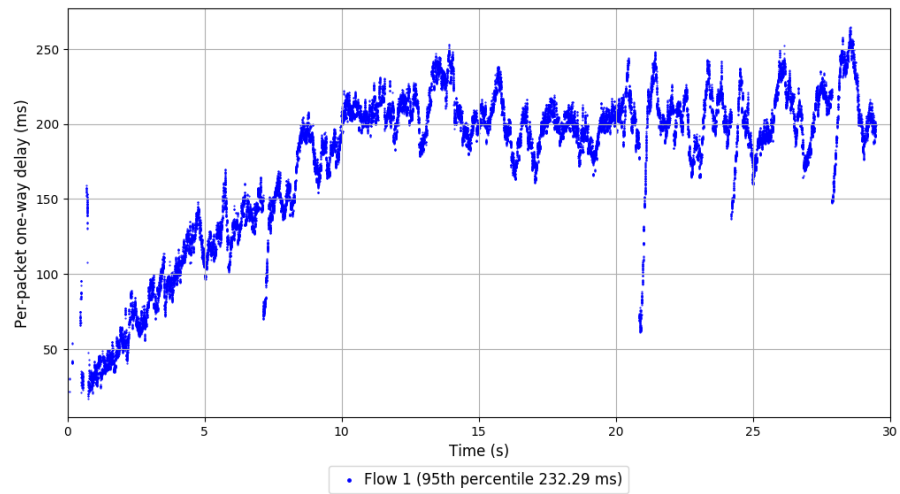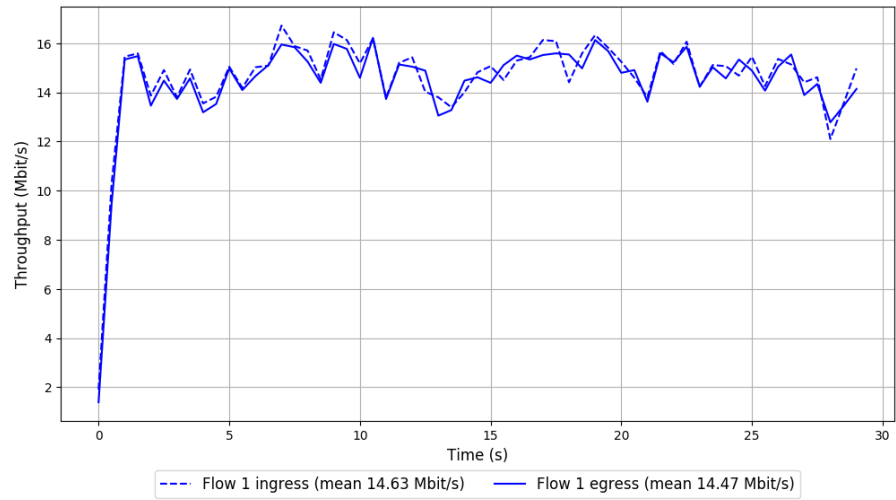
Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 2.31 Mbit/s) --- Flow 1 egress (mean 2.31 Mbit/s)

Flow 1 (95th percentile 35.06 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-11-30 05:31:45
End at: 2017-11-30 05:32:15
Local clock offset: -1.351 ms
Remote clock offset: -4.203 ms


# Below is generated by plot.py at 2017-11-30 06:55:45
# Datalink statistics
-- Total of 1 flow:
Average throughput: 14.47 Mbit/s
95th percentile per-packet one-way delay: 232.295 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 14.47 Mbit/s
95th percentile per-packet one-way delay: 232.295 ms
Loss rate: 1.17%
```

Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2017-11-30 05:48:13
End at: 2017-11-30 05:48:43
Local clock offset: -0.476 ms
Remote clock offset: -3.998 ms


# Below is generated by plot.py at 2017-11-30 06:55:47
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.01 Mbit/s
95th percentile per-packet one-way delay: 233.851 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 15.01 Mbit/s
95th percentile per-packet one-way delay: 233.851 ms
Loss rate: 1.09%
```
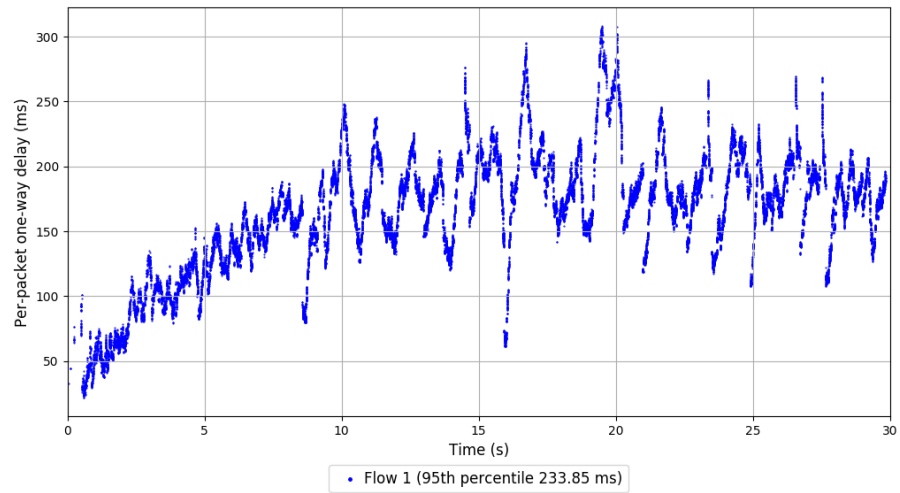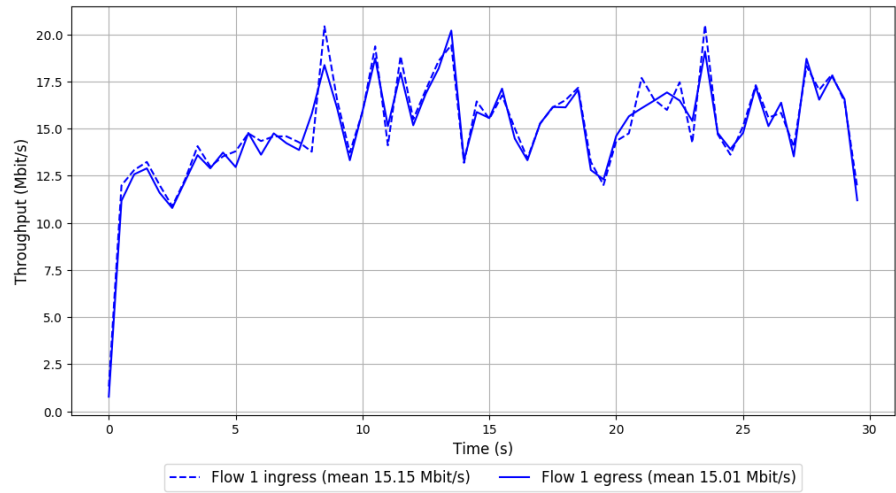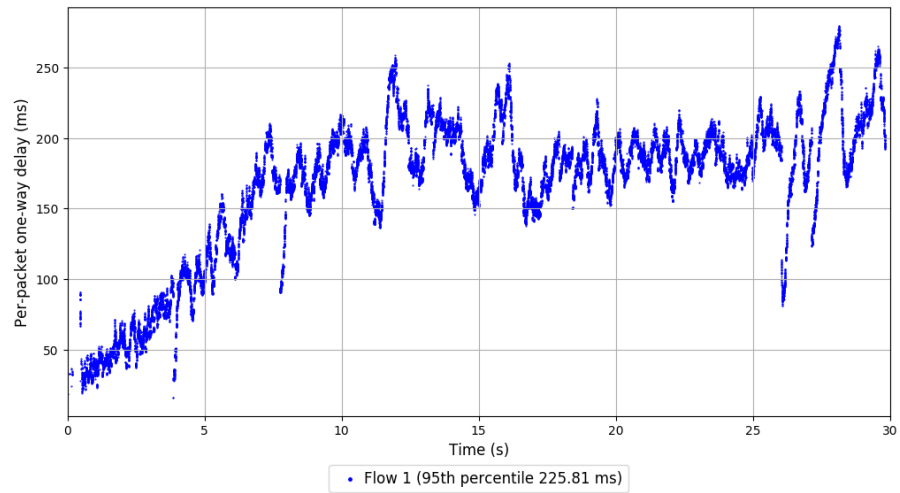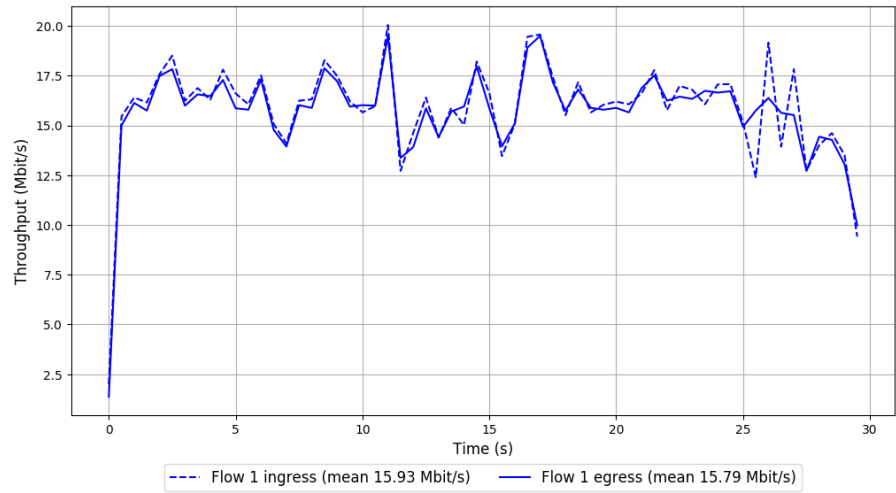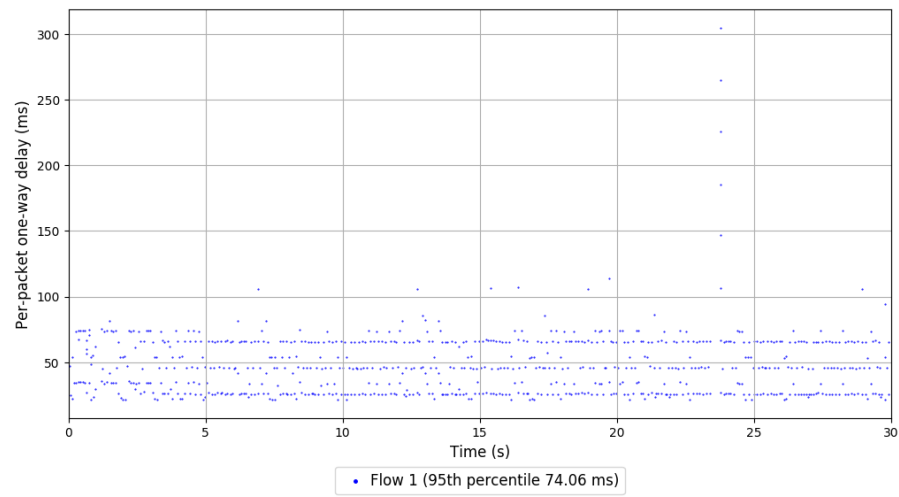
Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-11-30 06:04:43
End at: 2017-11-30 06:05:13
Local clock offset: -0.503 ms
Remote clock offset: -3.851 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.79 Mbit/s
95th percentile per-packet one-way delay: 225.815 ms
Loss rate: 1.02%
-- Flow 1:
Average throughput: 15.79 Mbit/s
95th percentile per-packet one-way delay: 225.815 ms
Loss rate: 1.02%
```
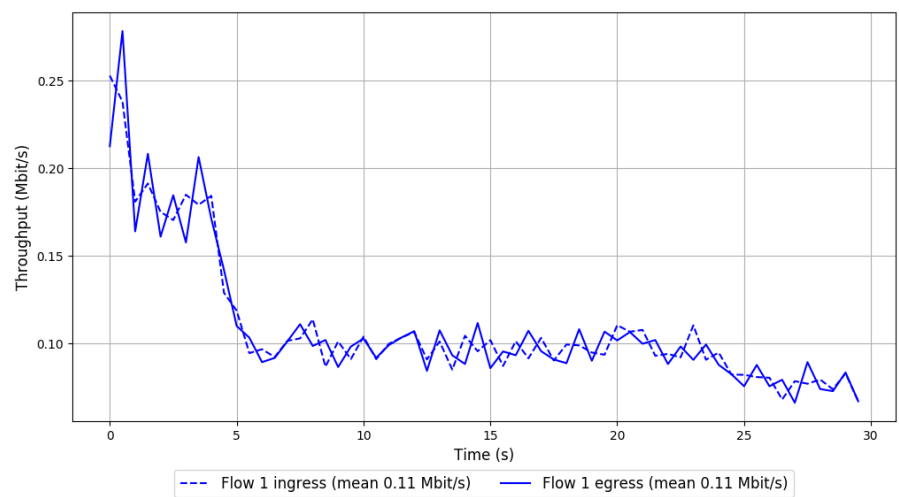
Run 3: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2017-11-30 05:22:19
End at: 2017-11-30 05:22:49
Local clock offset: -2.061 ms
Remote clock offset: -4.141 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 74.056 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 74.056 ms
Loss rate: 0.37%
```

Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.11 Mbit/s) — Flow 1 egress (mean 0.11 Mbit/s)

Flow 1 (95th percentile 74.06 ms)

```
Run 2: Statistics of SCReAM

Start at: 2017-11-30 05:38:49
End at: 2017-11-30 05:39:19
Local clock offset: -0.531 ms
Remote clock offset: -4.142 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 62.621 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 62.621 ms
Loss rate: 0.12%
```
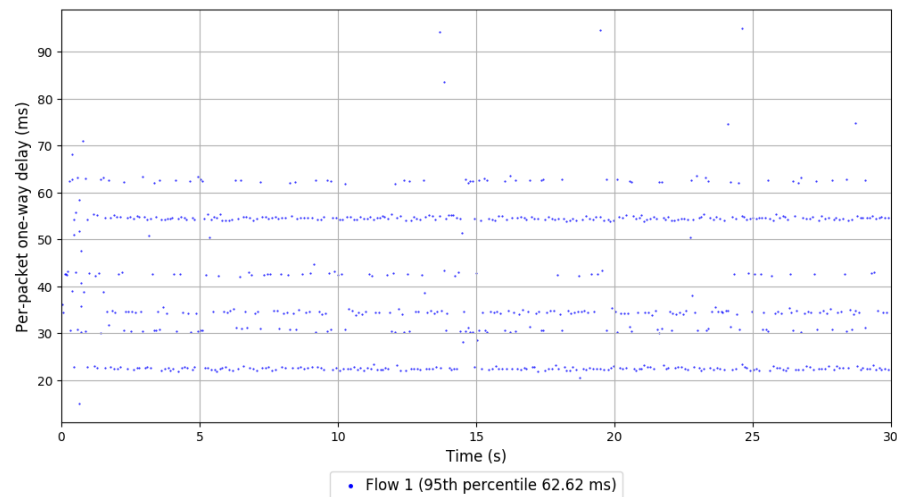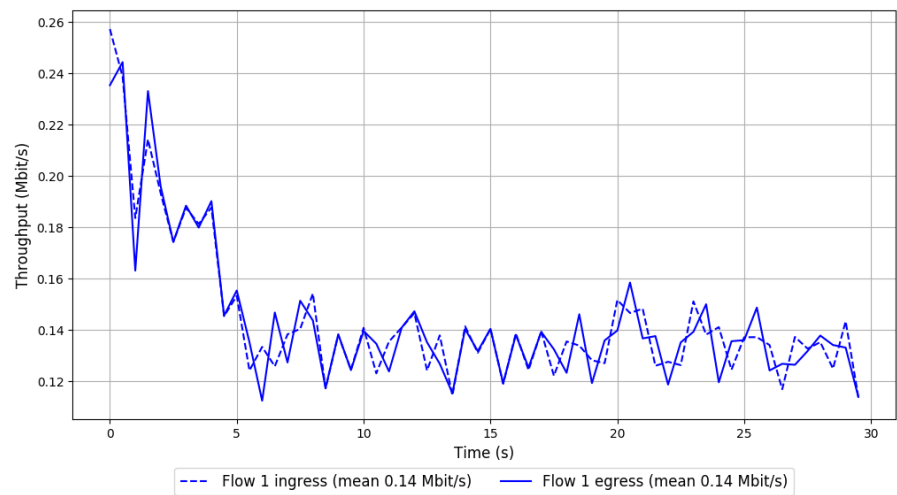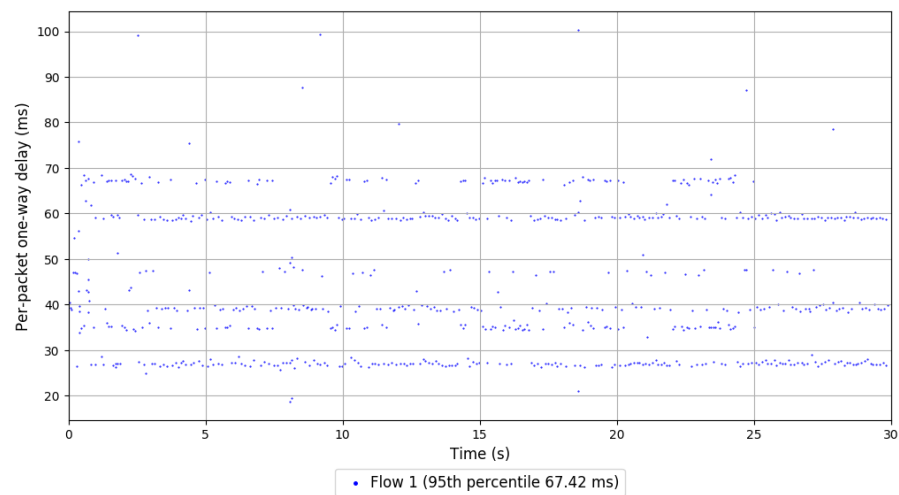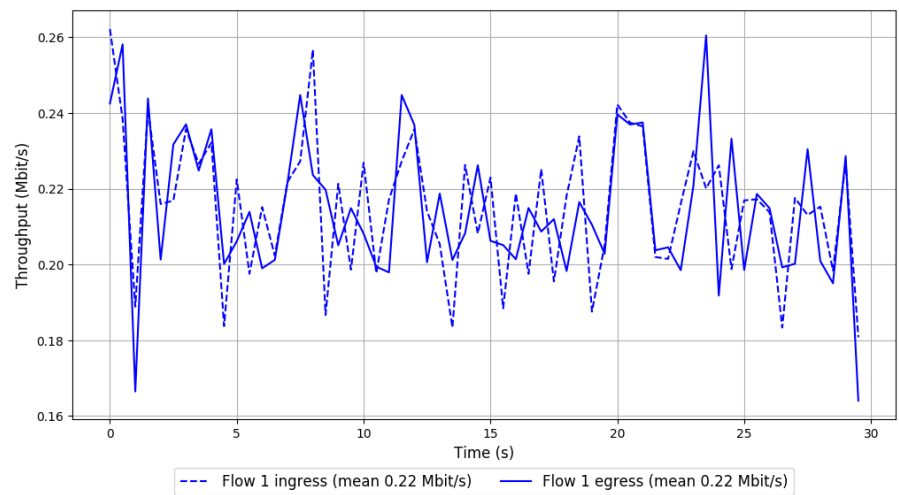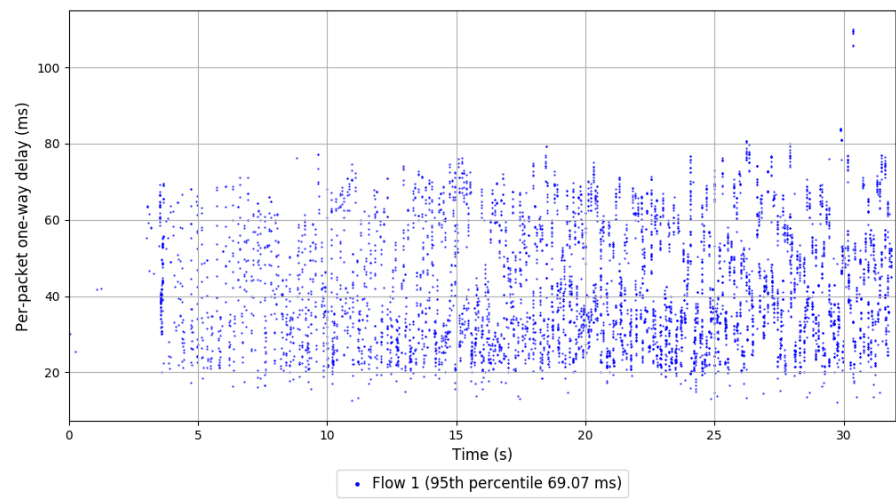
Run 2: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.14 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 62.62 ms)

```
Run 3: Statistics of SCReAM

Start at: 2017-11-30 05:55:17
End at: 2017-11-30 05:55:47
Local clock offset: -0.871 ms
Remote clock offset: -4.04 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 67.422 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 67.422 ms
Loss rate: 0.26%
```

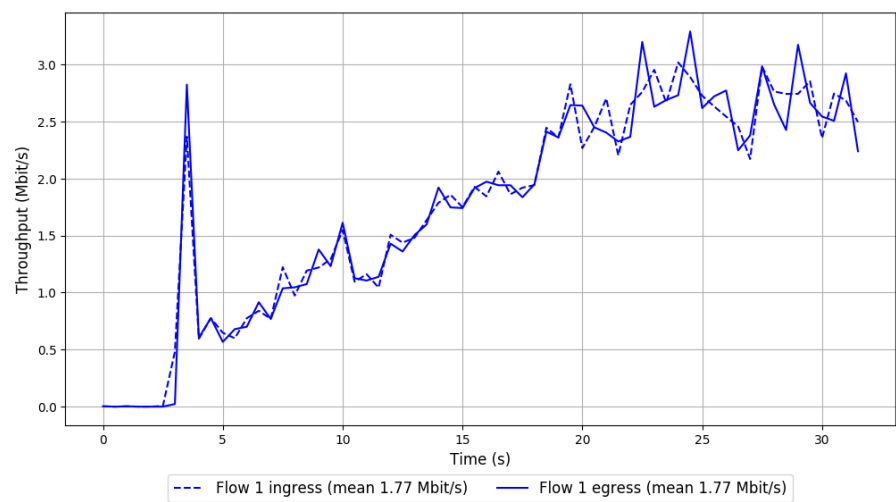Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2017-11-30 05:30:35
End at: 2017-11-30 05:31:05
Local clock offset: -1.274 ms
Remote clock offset: -4.198 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 69.068 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 69.068 ms
Loss rate: 0.23%
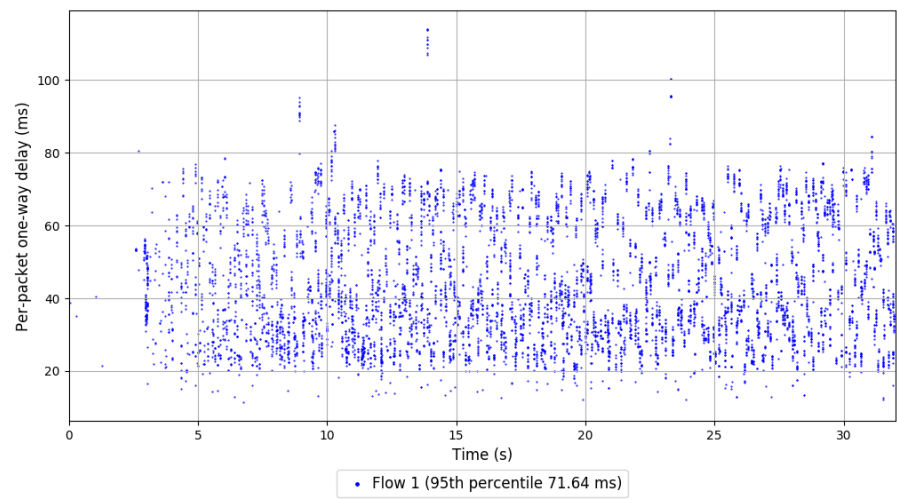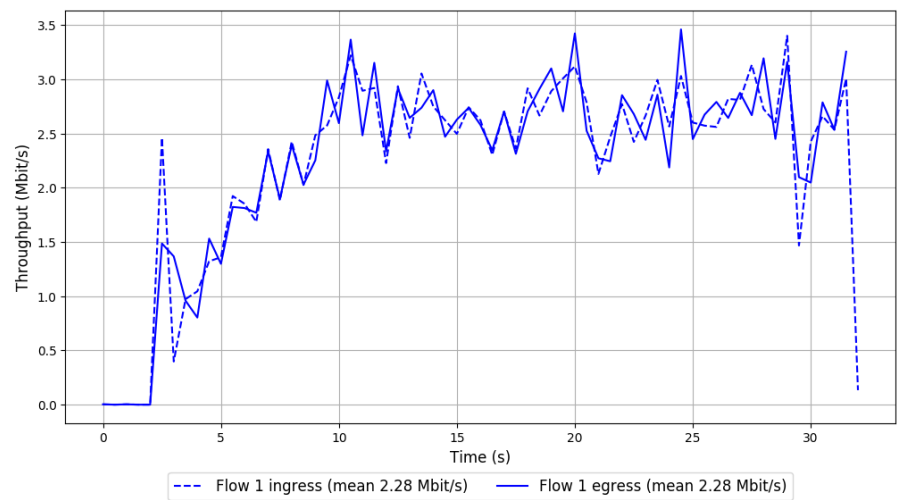```

Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2017-11-30 05:47:03
End at: 2017-11-30 05:47:33
Local clock offset: -0.535 ms
Remote clock offset: -4.006 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 71.644 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 71.644 ms
Loss rate: 0.11%
```

Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2017-11-30 06:03:33
End at: 2017-11-30 06:04:03
Local clock offset: -0.57 ms
Remote clock offset: -3.847 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 73.982 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 73.982 ms
Loss rate: 0.00%
```
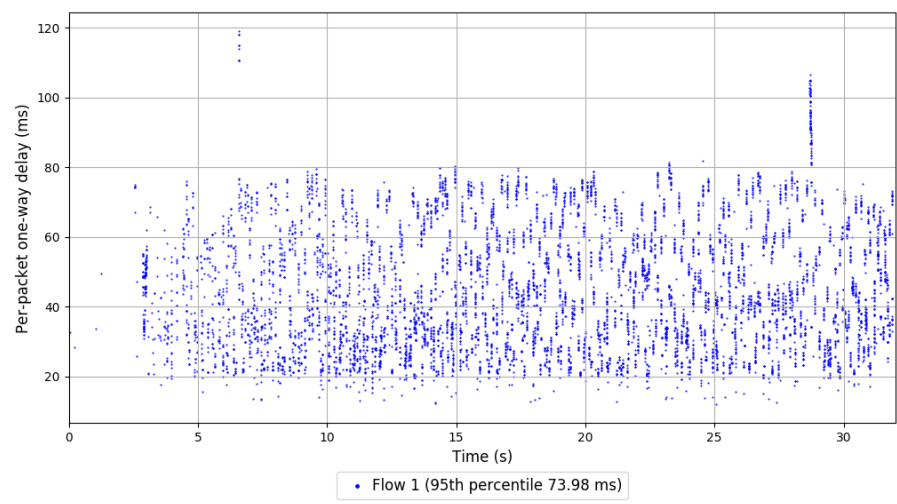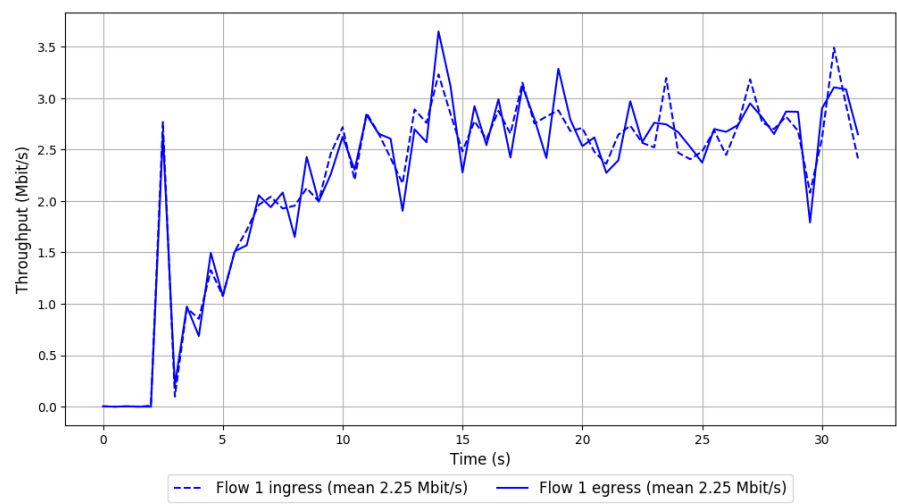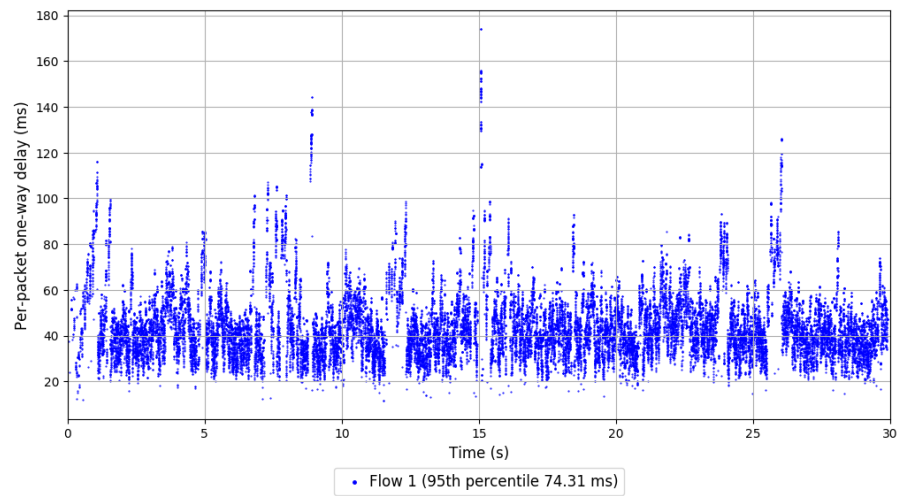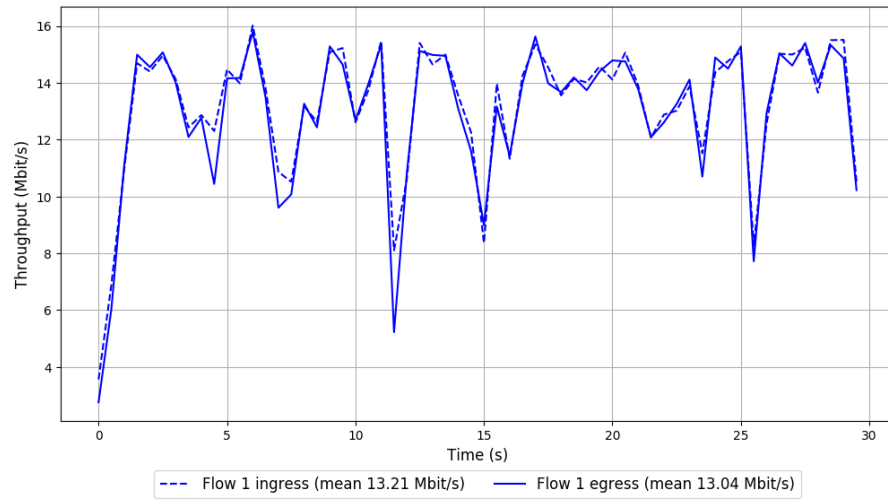
Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2017-11-30 05:25:51
End at: 2017-11-30 05:26:21
Local clock offset: -1.886 ms
Remote clock offset: -4.148 ms


# Below is generated by plot.py at 2017-11-30 06:55:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.04 Mbit/s
95th percentile per-packet one-way delay: 74.315 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 13.04 Mbit/s
95th percentile per-packet one-way delay: 74.315 ms
Loss rate: 1.50%
```

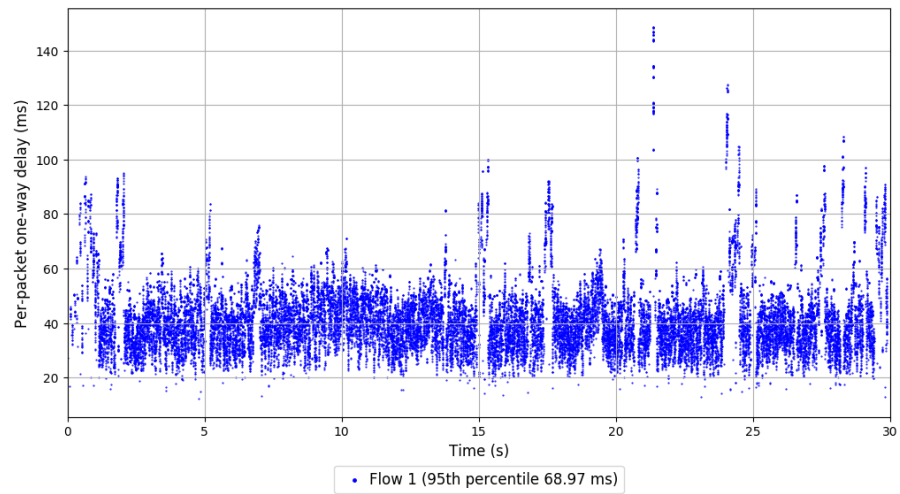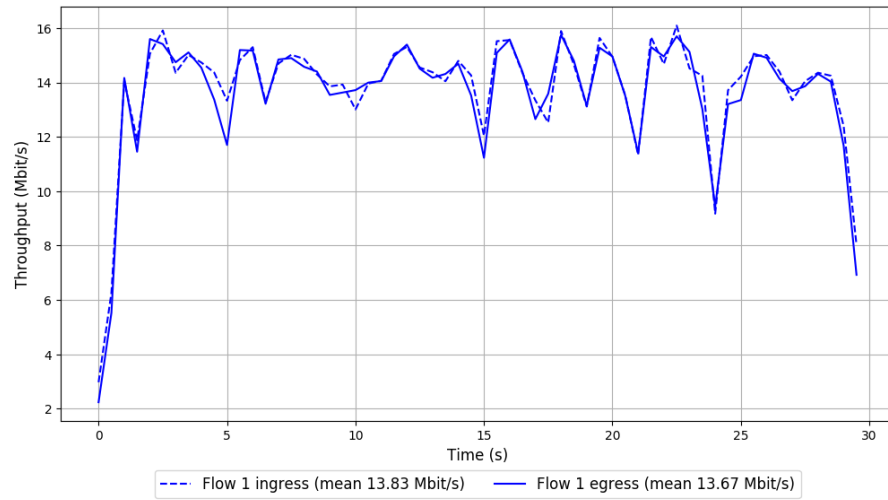Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-11-30 05:42:20
End at: 2017-11-30 05:42:50
Local clock offset: -0.391 ms
Remote clock offset: -4.138 ms


# Below is generated by plot.py at 2017-11-30 06:55:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.67 Mbit/s
95th percentile per-packet one-way delay: 68.973 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 13.67 Mbit/s
95th percentile per-packet one-way delay: 68.973 ms
Loss rate: 1.24%
```

Run 2: Report of Sprout — Data Link

Flow 1 ingress (mean 13.83 Mbit/s) ----- Flow 1 egress (mean 13.67 Mbit/s)

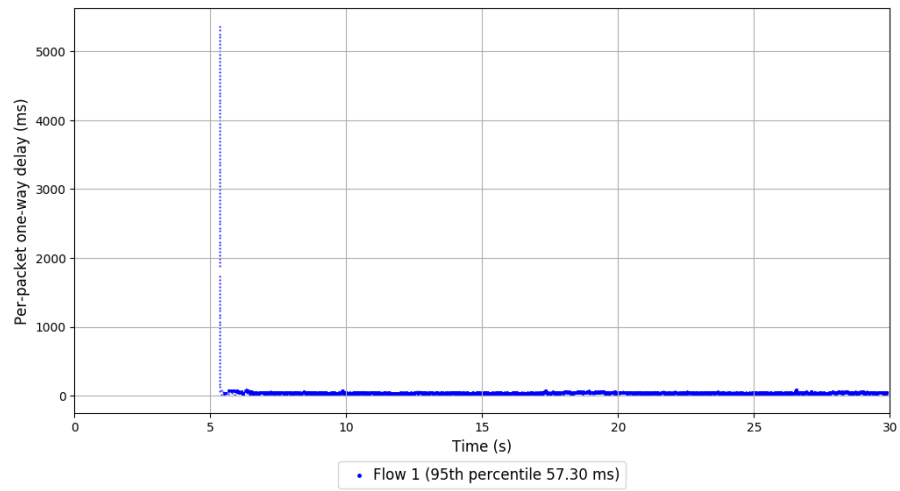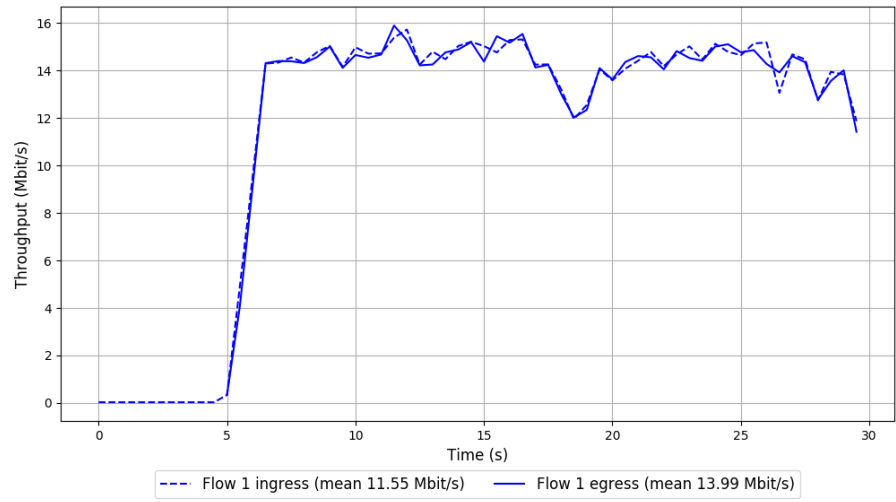Flow 1 (95th percentile 68.97 ms)

```
Run 3: Statistics of Sprout

Start at: 2017-11-30 05:58:49
End at: 2017-11-30 05:59:19
Local clock offset: -0.677 ms
Remote clock offset: -4.017 ms


# Below is generated by plot.py at 2017-11-30 06:55:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.99 Mbit/s
95th percentile per-packet one-way delay: 57.303 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 13.99 Mbit/s
95th percentile per-packet one-way delay: 57.303 ms
Loss rate: 0.59%
```

Run 3: Report of Sprout — Data Link

Flow 1 ingress (mean 11.55 Mbit/s) --- Flow 1 egress (mean 13.99 Mbit/s)

Flow 1 (95th percentile 57.30 ms)

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

Start at: 2017-11-30 05:29:24
End at: 2017-11-30 05:29:54
Local clock offset: -1.331 ms
Remote clock offset: -4.158 ms

# Below is generated by plot.py at 2017-11-30 06:55:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.34 Mbit/s
95th percentile per-packet one-way delay: 59.114 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 9.34 Mbit/s
95th percentile per-packet one-way delay: 59.114 ms
Loss rate: 0.47%
```
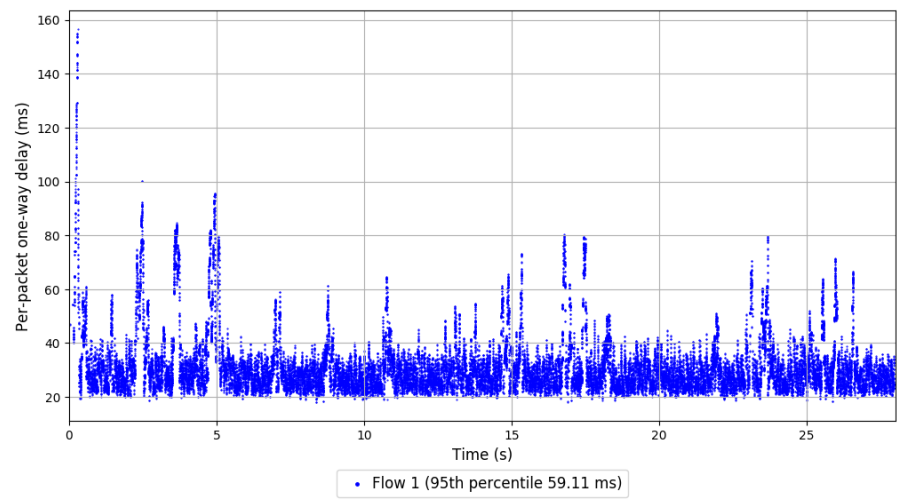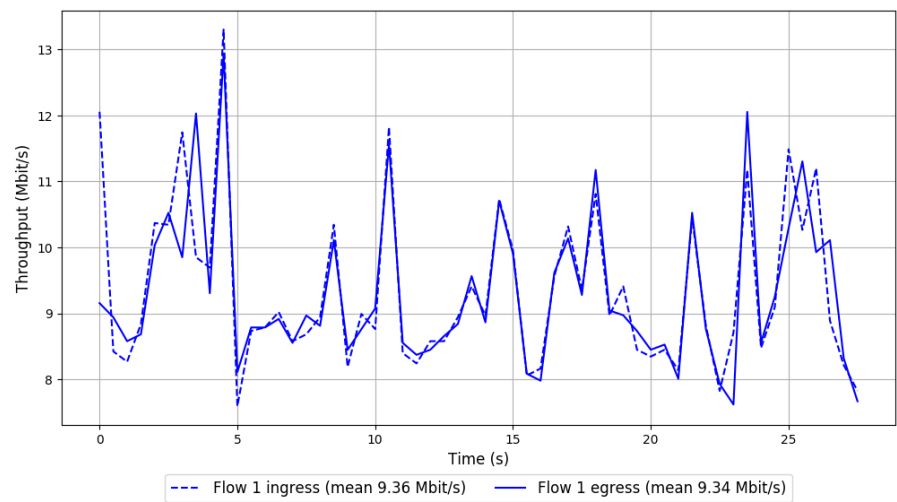
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 9.36 Mbit/s) — — —   Flow 1 egress (mean 9.34 Mbit/s) ———
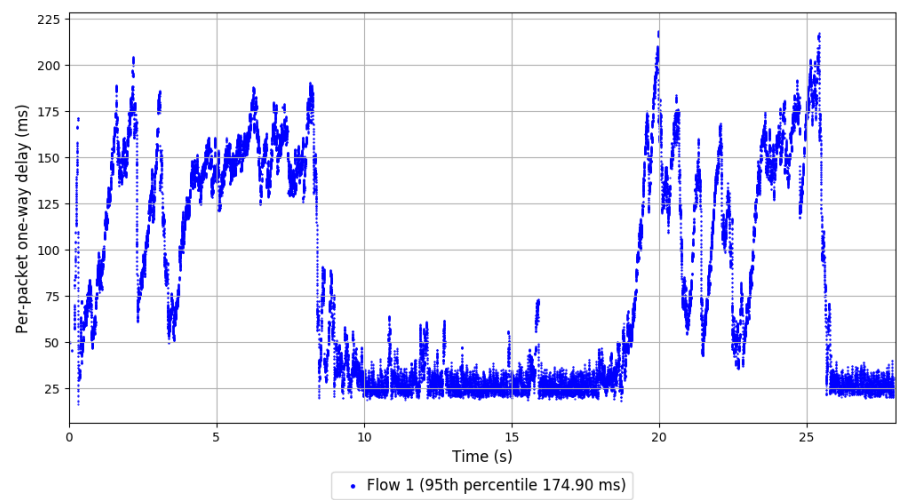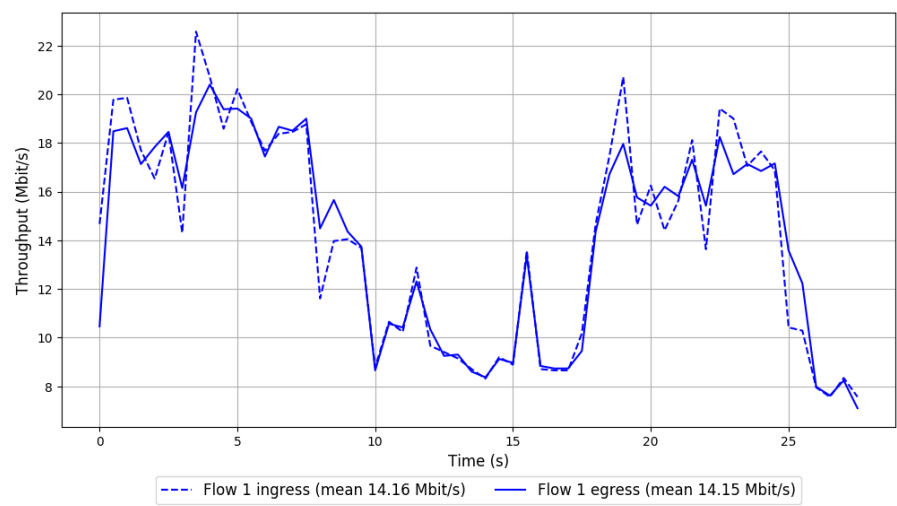

Flow 1 (95th percentile 59.11 ms)

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

Start at: 2017-11-30 05:45:51
End at: 2017-11-30 05:46:21
Local clock offset: -0.494 ms
Remote clock offset: -4.136 ms

# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 14.15 Mbit/s
95th percentile per-packet one-way delay: 174.895 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 14.15 Mbit/s
95th percentile per-packet one-way delay: 174.895 ms
Loss rate: 0.36%
```

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

Flow 1 ingress (mean 14.16 Mbit/s) —— Flow 1 egress (mean 14.15 Mbit/s)
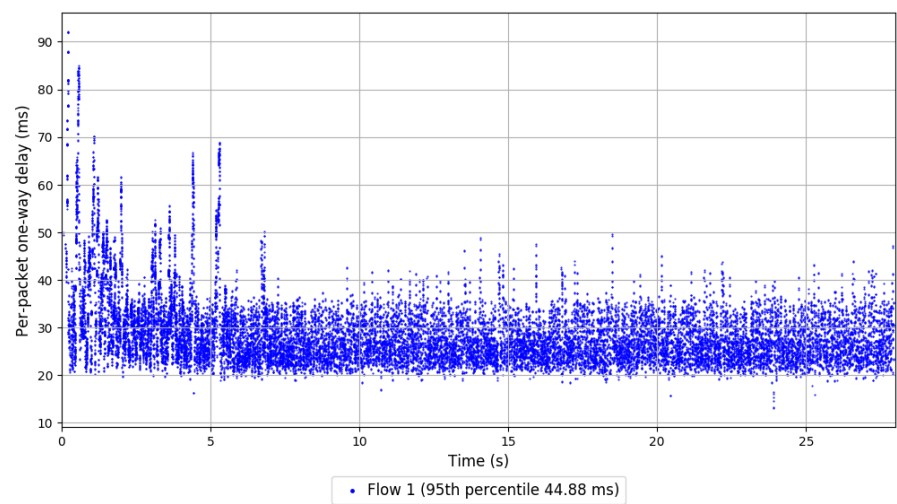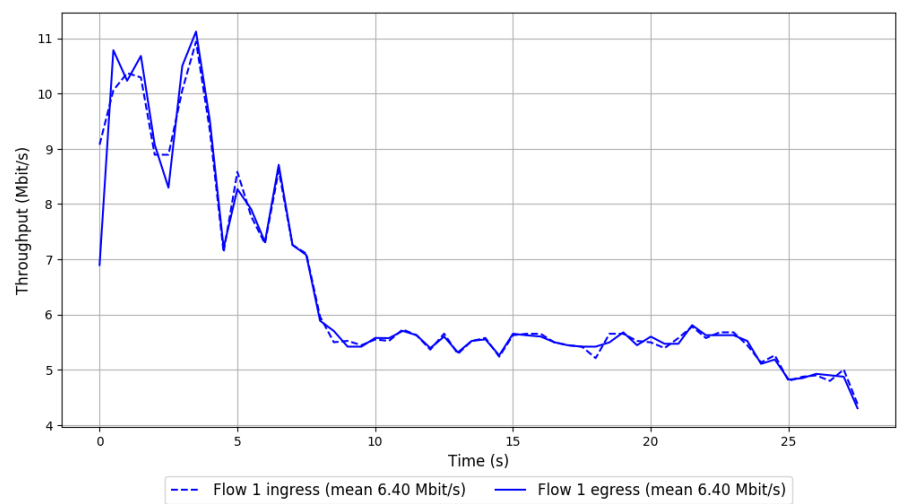

• Flow 1 (95th percentile 174.90 ms)

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

Start at: 2017-11-30 06:02:21
End at: 2017-11-30 06:02:52
Local clock offset: -0.493 ms
Remote clock offset: -3.912 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.40 Mbit/s
95th percentile per-packet one-way delay: 44.879 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 6.40 Mbit/s
95th percentile per-packet one-way delay: 44.879 ms
Loss rate: 0.24%
```

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

57

```
Run 1: Statistics of TCP Vegas

Start at: 2017-11-30 05:19:57
End at: 2017-11-30 05:20:27
Local clock offset: -1.87 ms
Remote clock offset: -4.23 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.38 Mbit/s
95th percentile per-packet one-way delay: 126.131 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 5.38 Mbit/s
95th percentile per-packet one-way delay: 126.131 ms
Loss rate: 0.05%
```
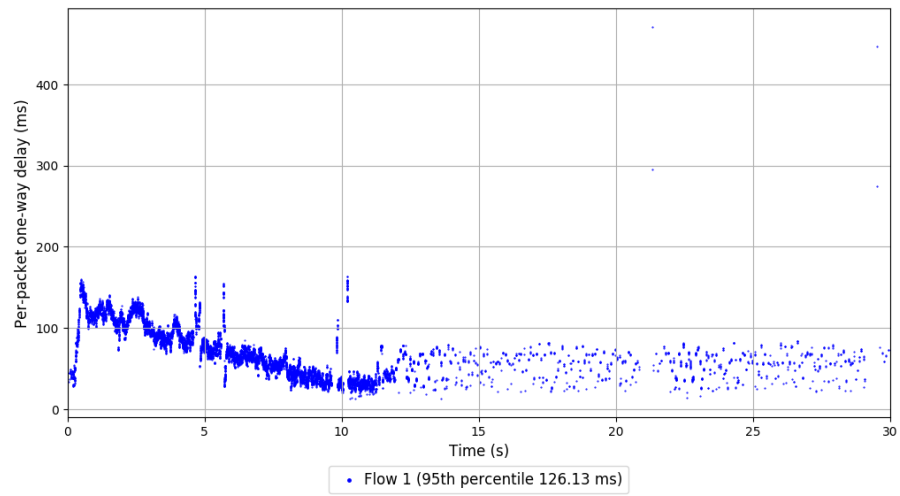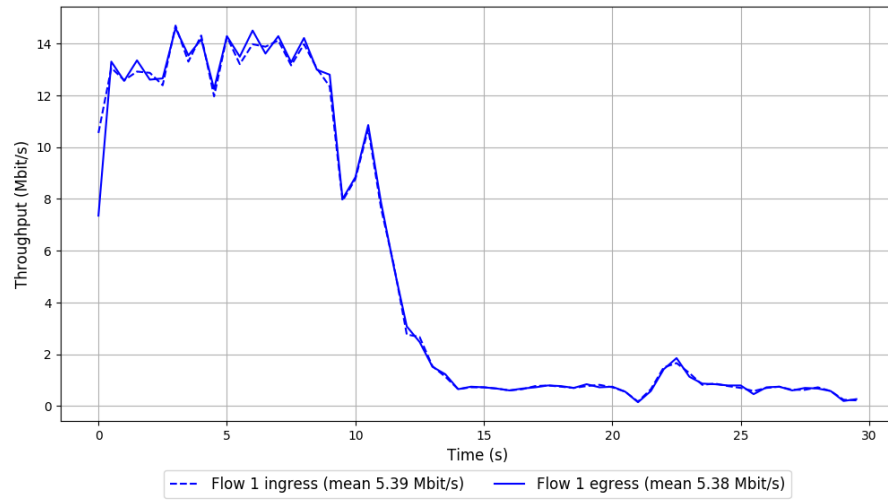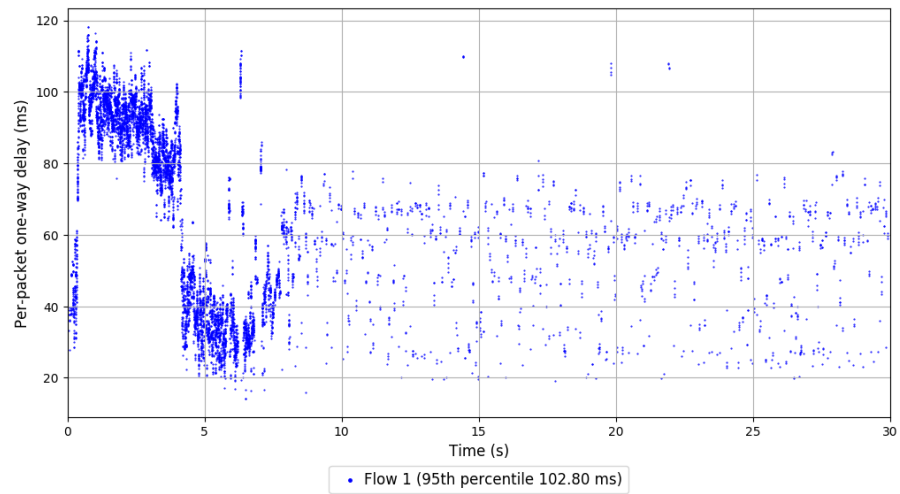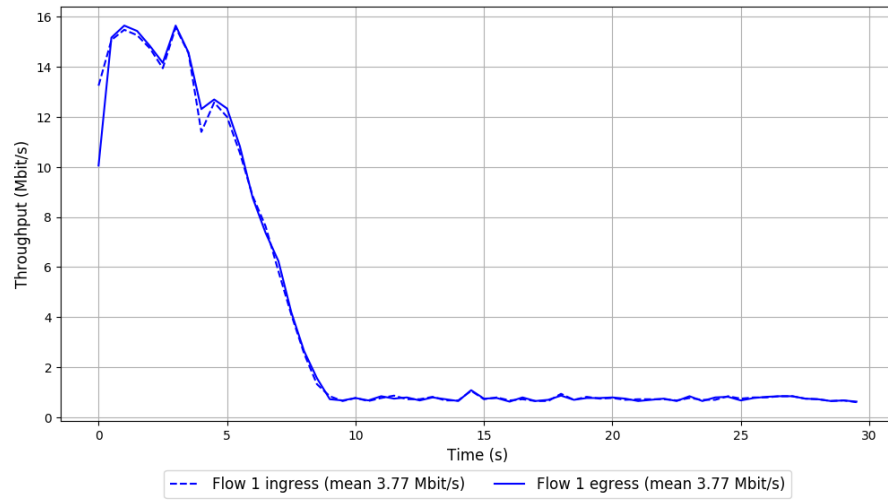
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-11-30 05:36:27
End at: 2017-11-30 05:36:57
Local clock offset: -0.769 ms
Remote clock offset: -4.168 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.77 Mbit/s
95th percentile per-packet one-way delay: 102.799 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 3.77 Mbit/s
95th percentile per-packet one-way delay: 102.799 ms
Loss rate: 0.13%
```
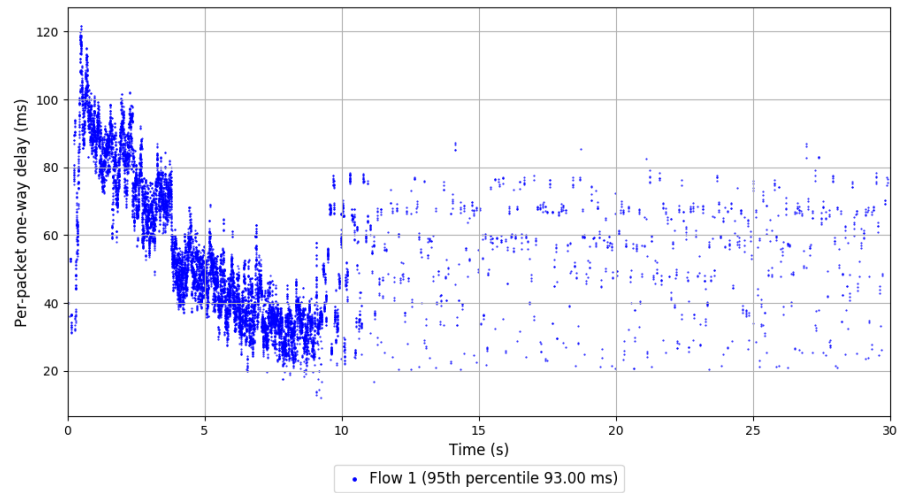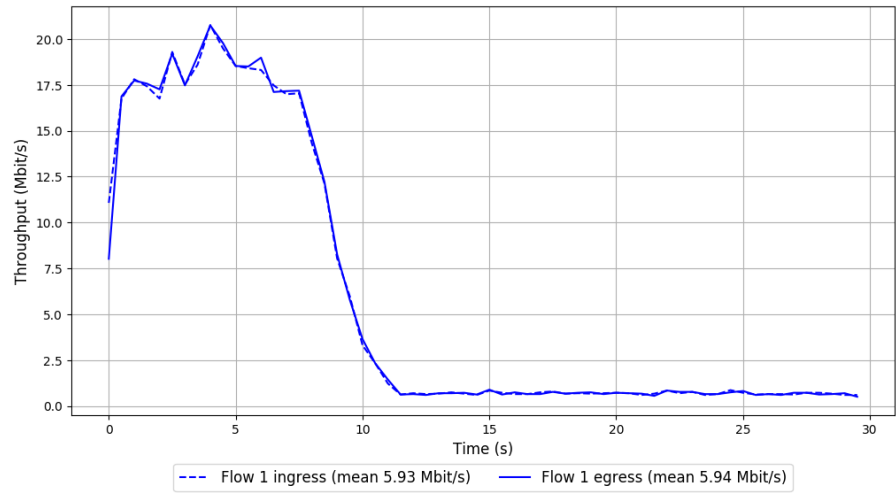
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2017-11-30 05:52:56
End at: 2017-11-30 05:53:26
Local clock offset: -0.678 ms
Remote clock offset: -4.055 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.94 Mbit/s
95th percentile per-packet one-way delay: 92.998 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 5.94 Mbit/s
95th percentile per-packet one-way delay: 92.998 ms
Loss rate: 0.03%
```

Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 5.93 Mbit/s) ---- Flow 1 egress (mean 5.94 Mbit/s) ——

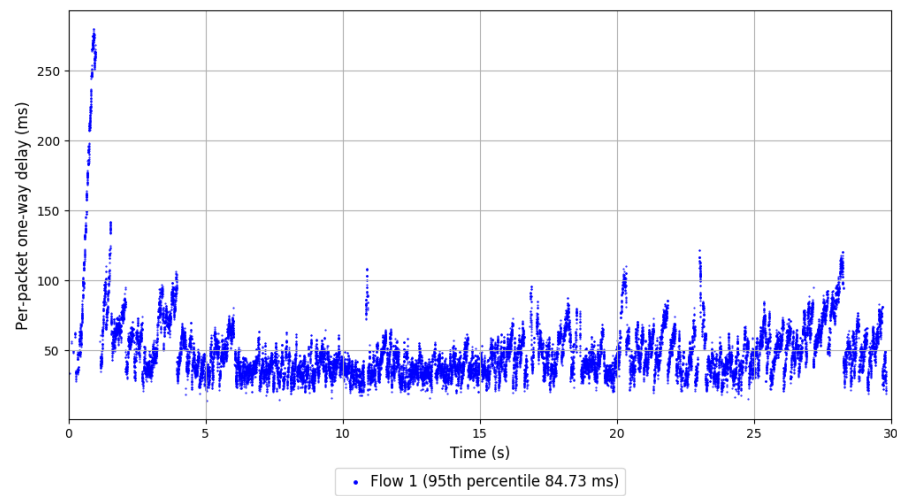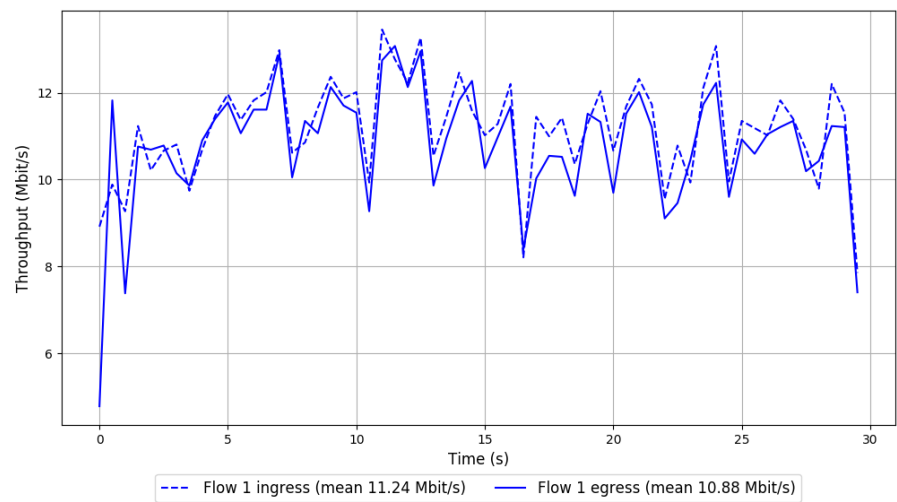
Flow 1 (95th percentile 93.00 ms) •

```
Run 1: Statistics of Verus

Start at: 2017-11-30 05:18:46
End at: 2017-11-30 05:19:16
Local clock offset: -1.94 ms
Remote clock offset: -4.203 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.88 Mbit/s
95th percentile per-packet one-way delay: 84.727 ms
Loss rate: 3.45%
-- Flow 1:
Average throughput: 10.88 Mbit/s
95th percentile per-packet one-way delay: 84.727 ms
Loss rate: 3.45%
```

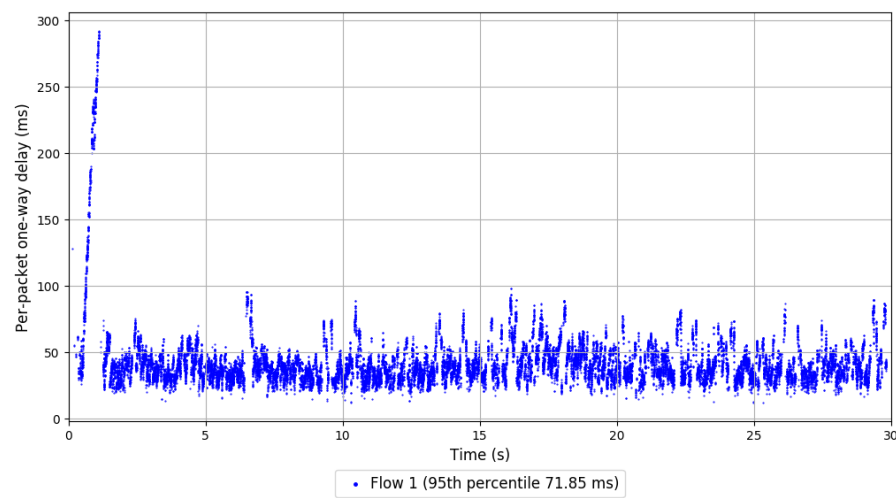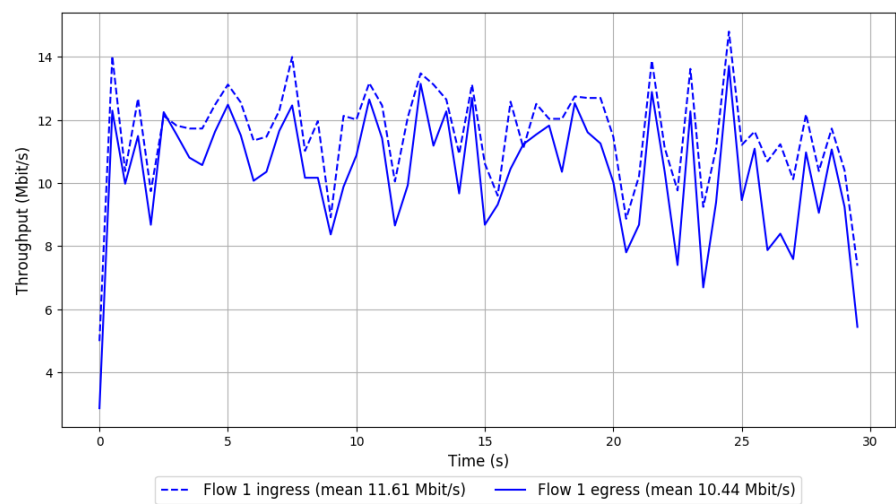Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2017-11-30 05:35:16
End at: 2017-11-30 05:35:46
Local clock offset: -1.015 ms
Remote clock offset: -4.076 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.44 Mbit/s
95th percentile per-packet one-way delay: 71.853 ms
Loss rate: 10.57%
-- Flow 1:
Average throughput: 10.44 Mbit/s
95th percentile per-packet one-way delay: 71.853 ms
Loss rate: 10.57%
```
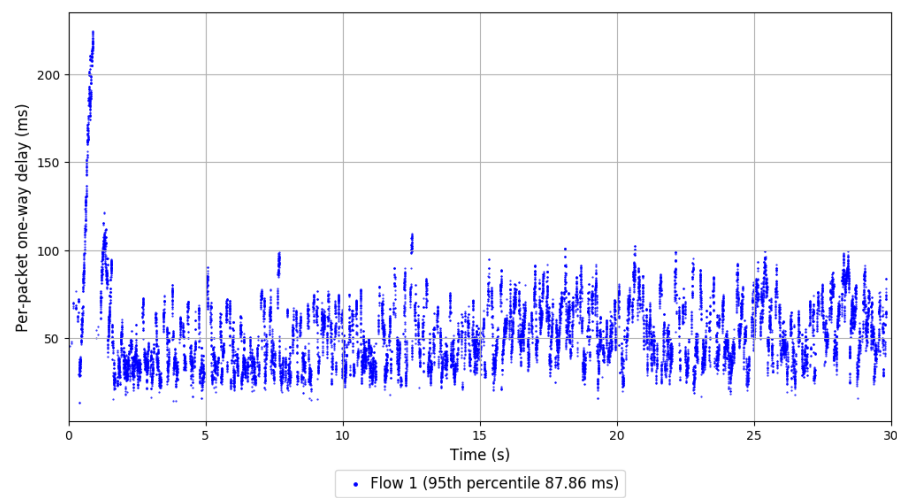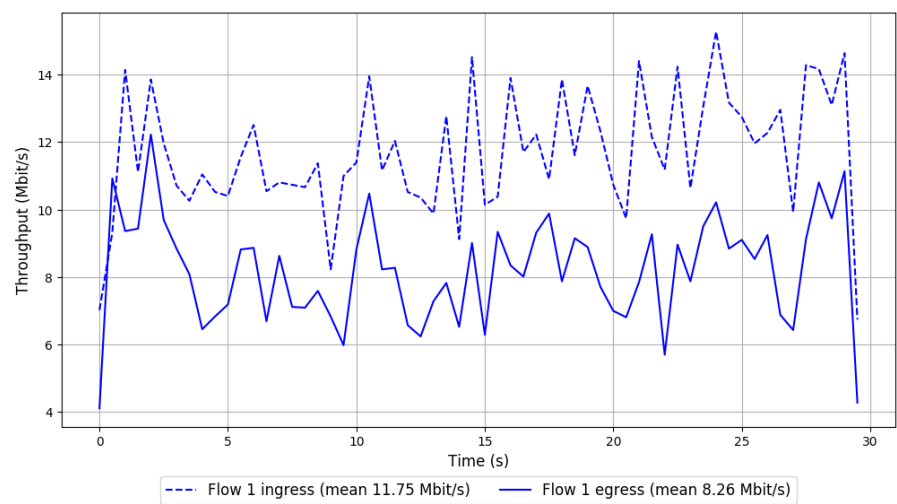
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2017-11-30 05:51:45
End at: 2017-11-30 05:52:15
Local clock offset: -0.621 ms
Remote clock offset: -4.024 ms


# Below is generated by plot.py at 2017-11-30 06:56:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.26 Mbit/s
95th percentile per-packet one-way delay: 87.858 ms
Loss rate: 29.85%
-- Flow 1:
Average throughput: 8.26 Mbit/s
95th percentile per-packet one-way delay: 87.858 ms
Loss rate: 29.85%
```

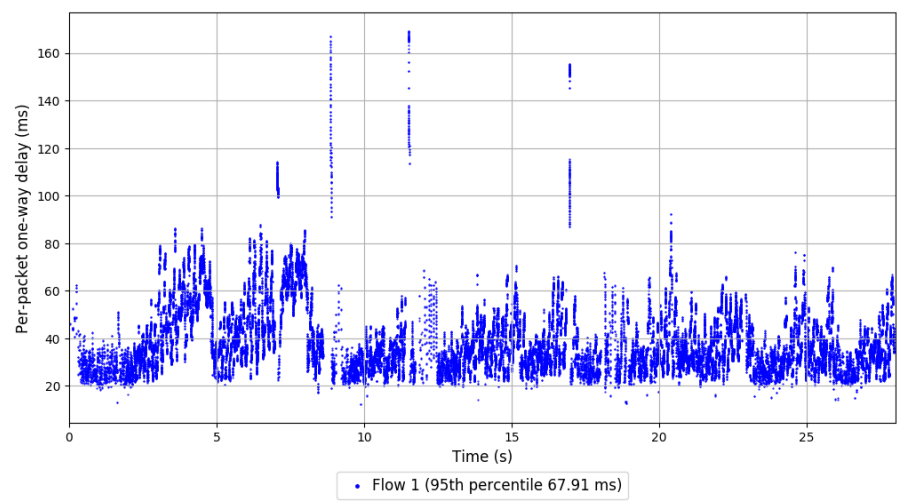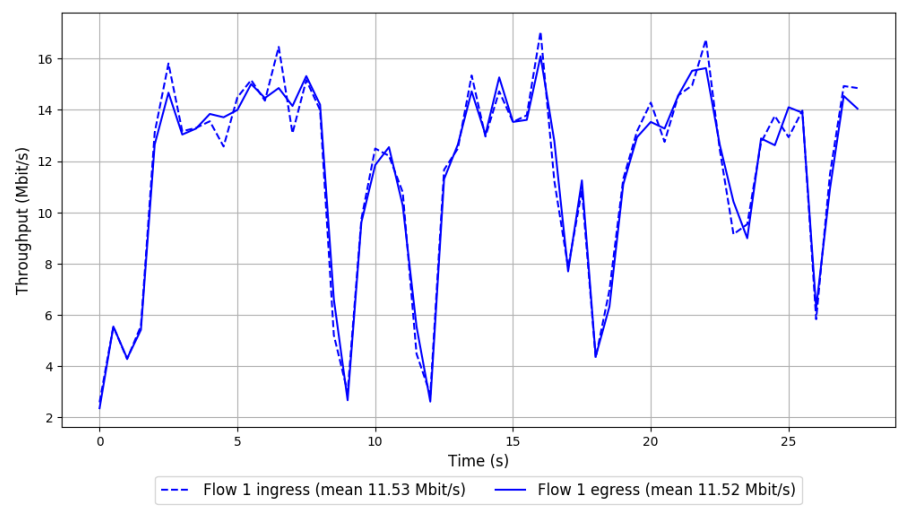Run 3: Report of Verus — Data Link

```
Run 1: Statistics of Copa

Start at: 2017-11-30 05:23:29
End at: 2017-11-30 05:23:59
Local clock offset: -2.193 ms
Remote clock offset: -4.203 ms


# Below is generated by plot.py at 2017-11-30 06:56:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.52 Mbit/s
95th percentile per-packet one-way delay: 67.909 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 11.52 Mbit/s
95th percentile per-packet one-way delay: 67.909 ms
Loss rate: 0.34%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 11.53 Mbit/s) --- Flow 1 egress (mean 11.52 Mbit/s)
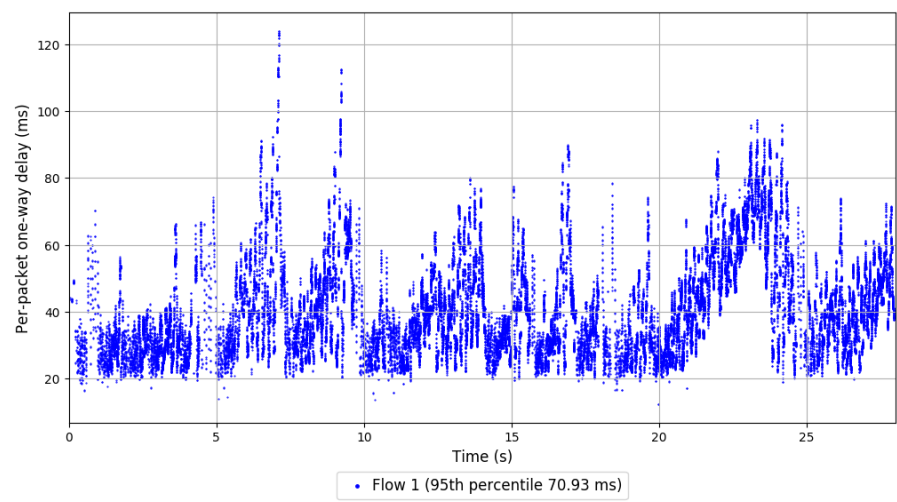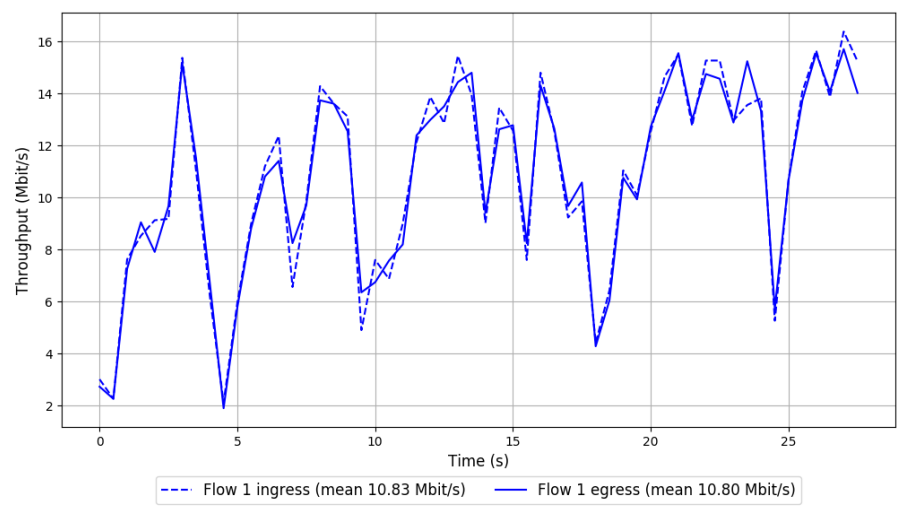

Flow 1 (95th percentile 67.91 ms)

```
Run 2: Statistics of Copa

Start at: 2017-11-30 05:39:59
End at: 2017-11-30 05:40:29
Local clock offset: -0.383 ms
Remote clock offset: -4.034 ms


# Below is generated by plot.py at 2017-11-30 06:56:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 70.933 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 70.933 ms
Loss rate: 0.48%
```

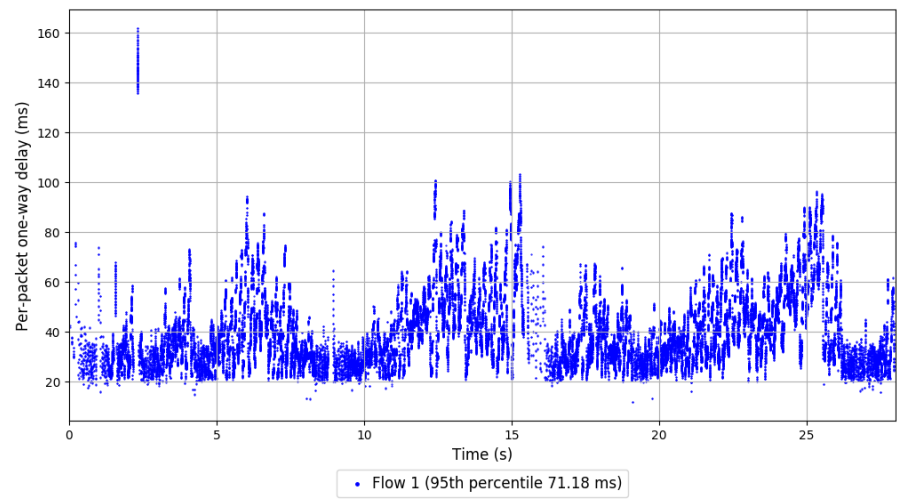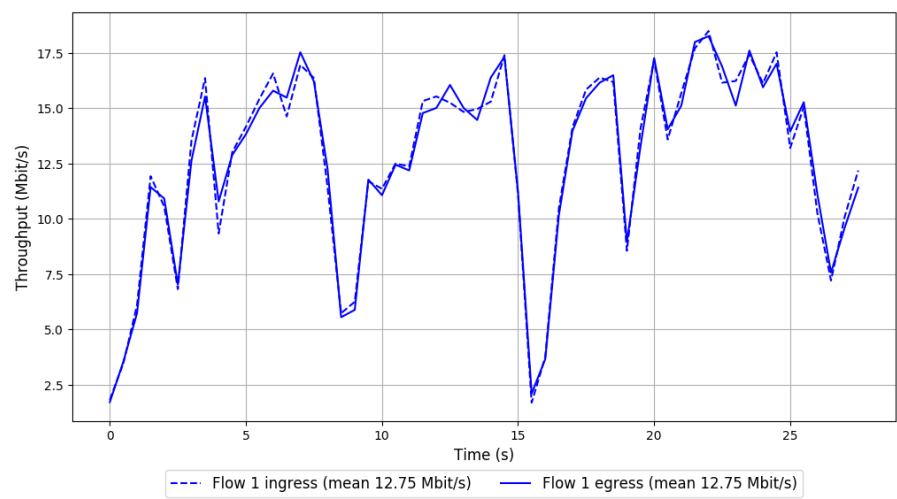Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2017-11-30 05:56:27
End at: 2017-11-30 05:56:57
Local clock offset: -0.893 ms
Remote clock offset: -3.958 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.75 Mbit/s
95th percentile per-packet one-way delay: 71.177 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 12.75 Mbit/s
95th percentile per-packet one-way delay: 71.177 ms
Loss rate: 0.20%
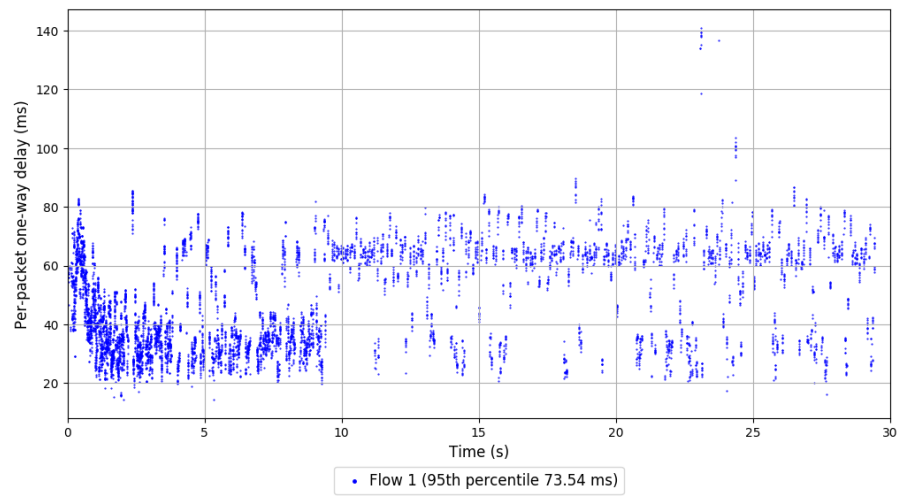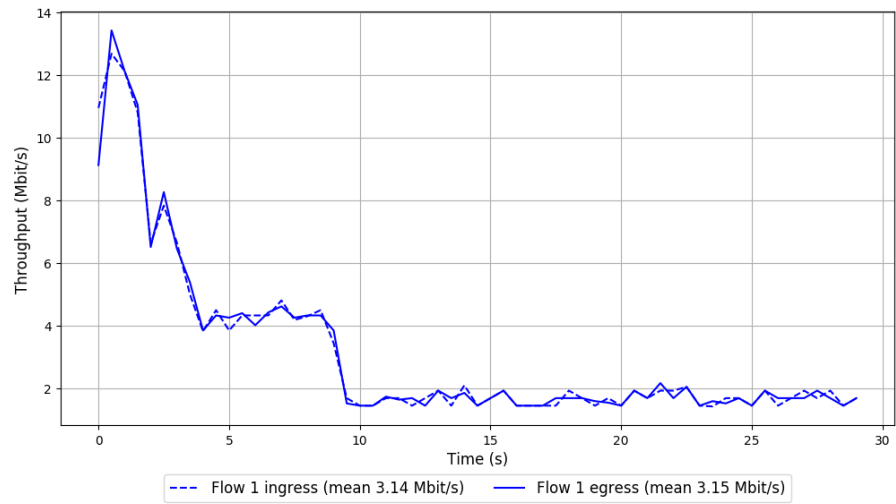```

Run 3: Report of Copa — Data Link

```
Run 1: Statistics of Indigo

Start at: 2017-11-30 05:16:25
End at: 2017-11-30 05:16:56
Local clock offset: -1.893 ms
Remote clock offset: -4.106 ms

Below is generated by plot.py at 2017-11-30 06:56:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 73.536 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 73.536 ms
Loss rate: 0.13%
```
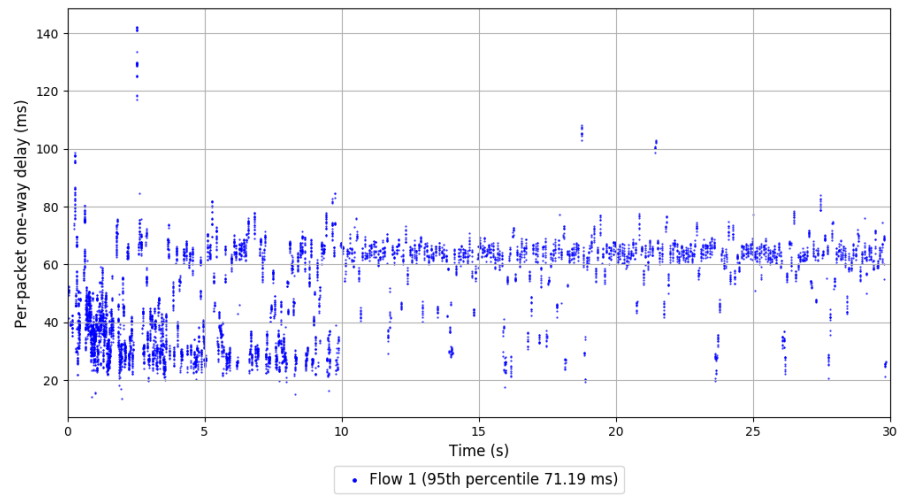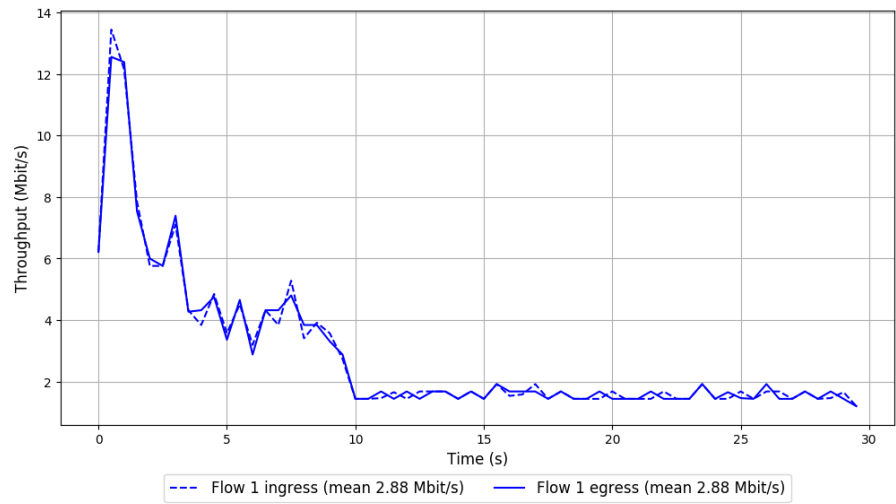
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-11-30 05:32:56
End at: 2017-11-30 05:33:26
Local clock offset: -1.401 ms
Remote clock offset: -4.133 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 71.193 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 71.193 ms
Loss rate: 0.14%
```

Run 2: Report of Indigo — Data Link

```
Run 3: Statistics of Indigo

Start at: 2017-11-30 05:49:24
End at: 2017-11-30 05:49:54
Local clock offset: -0.519 ms
Remote clock offset: -4.096 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 74.743 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 74.743 ms
Loss rate: 0.29%
```
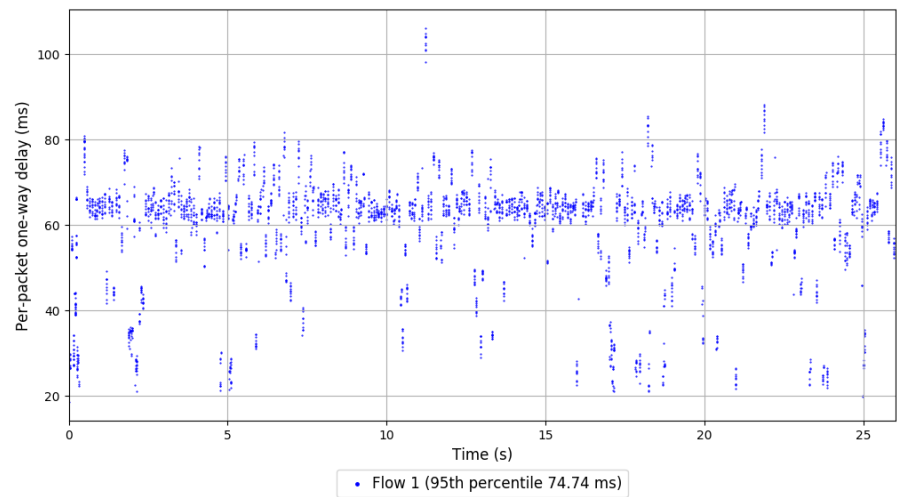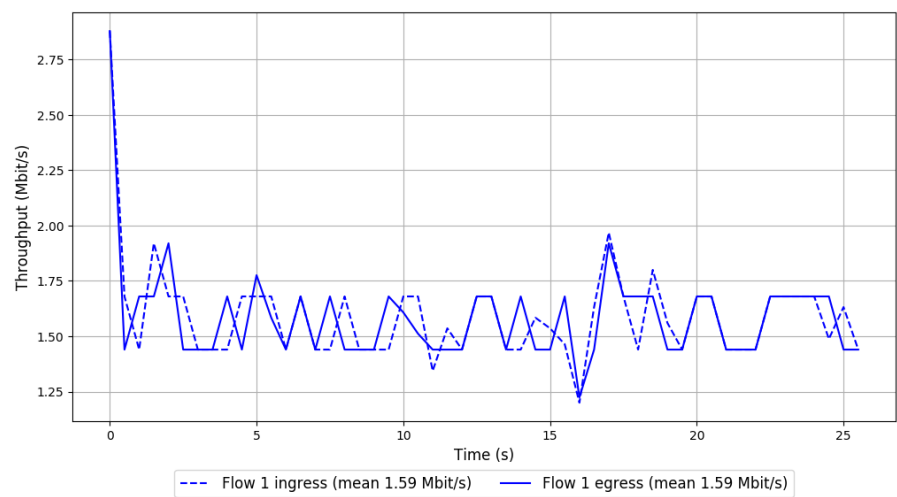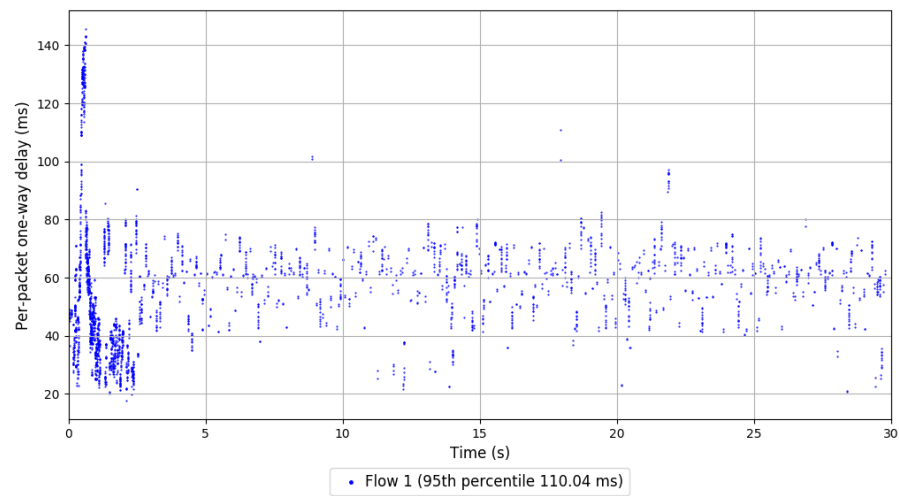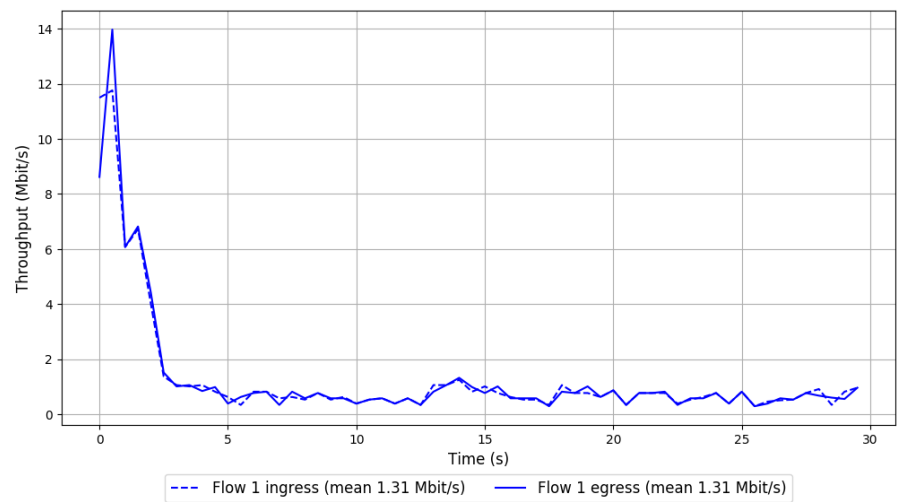
Run 3: Report of Indigo — Data Link

```
Run 1: Statistics of Indigo-calib

Start at: 2017-11-30 05:27:02
End at: 2017-11-30 05:27:32
Local clock offset: -1.6 ms
Remote clock offset: -4.209 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 110.042 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 110.042 ms
Loss rate: 0.40%
```

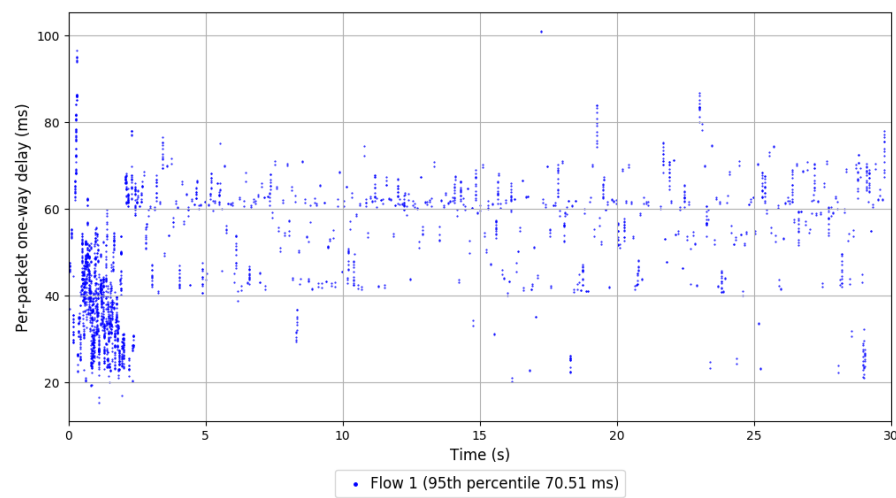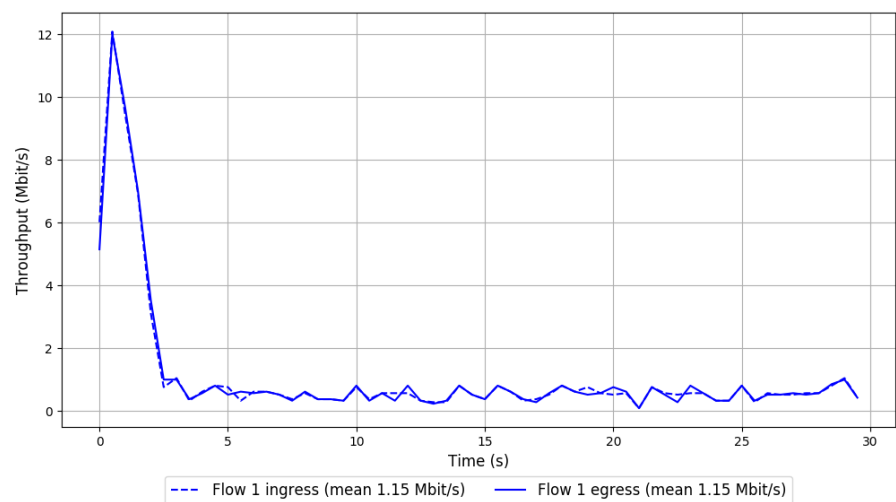Run 1: Report of Indigo-calib — Data Link

```
Run 2: Statistics of Indigo-calib

Start at: 2017-11-30 05:43:30
End at: 2017-11-30 05:44:01
Local clock offset: -0.375 ms
Remote clock offset: -4.011 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 70.513 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 70.513 ms
Loss rate: 0.07%
```

Run 2: Report of Indigo-calib — Data Link

Flow 1 ingress (mean 1.15 Mbit/s)   Flow 1 egress (mean 1.15 Mbit/s)

Flow 1 (95th percentile 70.51 ms)

```
Run 3: Statistics of Indigo-calib

Start at: 2017-11-30 06:00:00
End at: 2017-11-30 06:00:30
Local clock offset: -0.552 ms
Remote clock offset: -3.987 ms


# Below is generated by plot.py at 2017-11-30 06:56:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 72.004 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 72.004 ms
Loss rate: 0.75%
```

Run 3: Report of Indigo-calib — Data Link

Flow 1 ingress (mean 0.70 Mbit/s)   Flow 1 egress (mean 0.70 Mbit/s)

• Flow 1 (95th percentile 72.00 ms)