Pantheon Report

Generated at 2017-11-20 23:24:27 (UTC).

Data path: India ppp0 (*remote*) →AWS India 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).
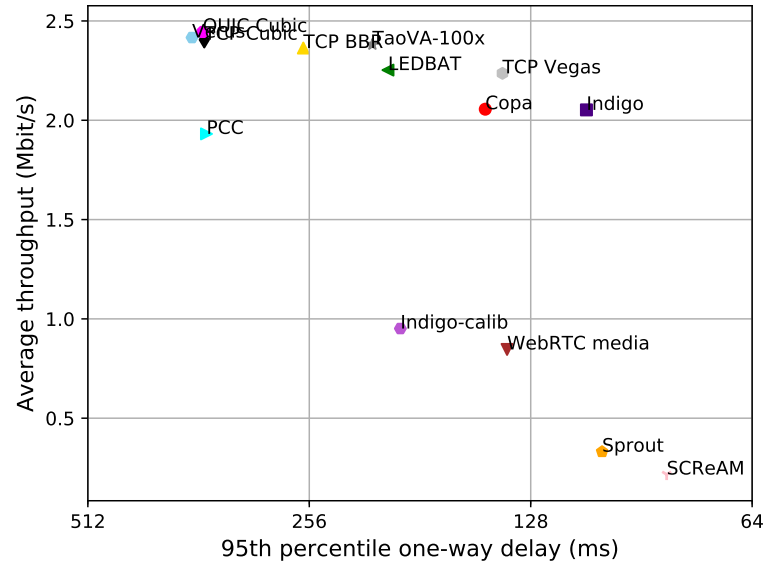
Tested BBR with qdisc of Fair Queuing (`fq`), and other schemes with the default Linux qdisc (`pfifo_fast`).

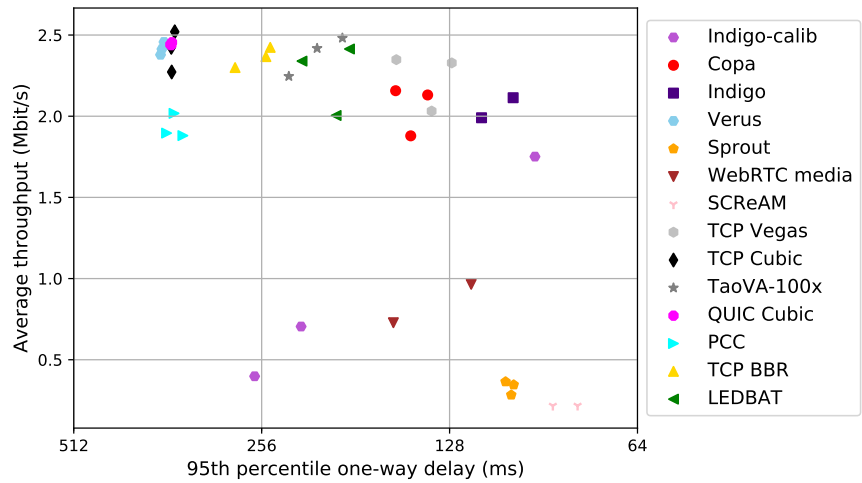NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

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

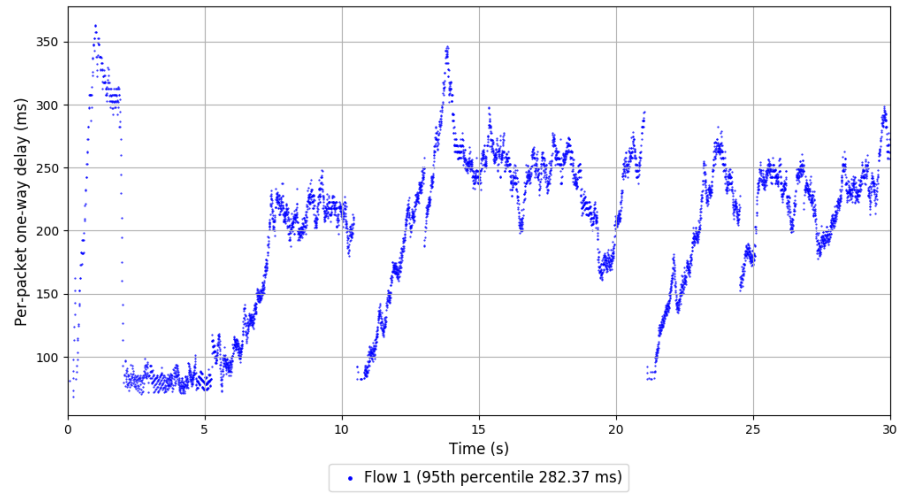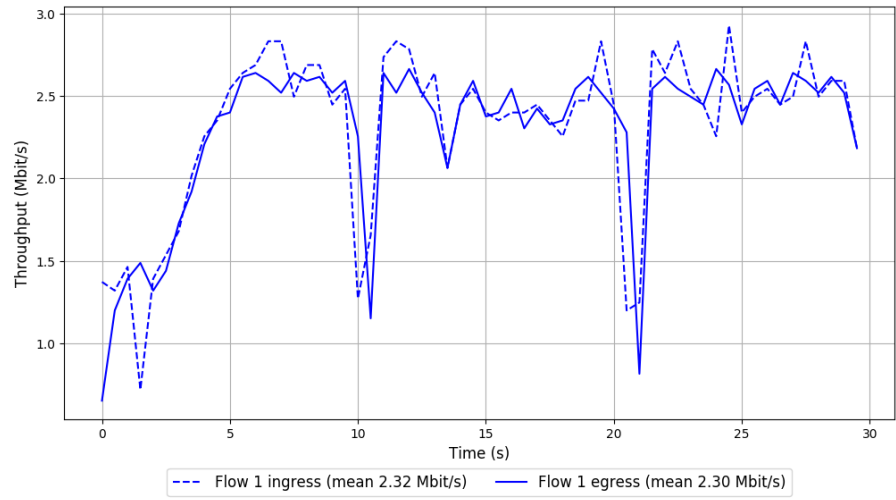test from India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme

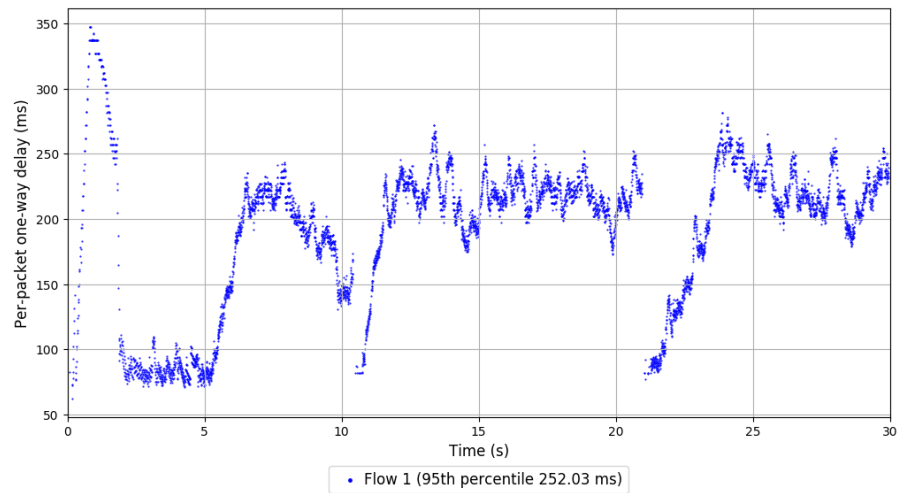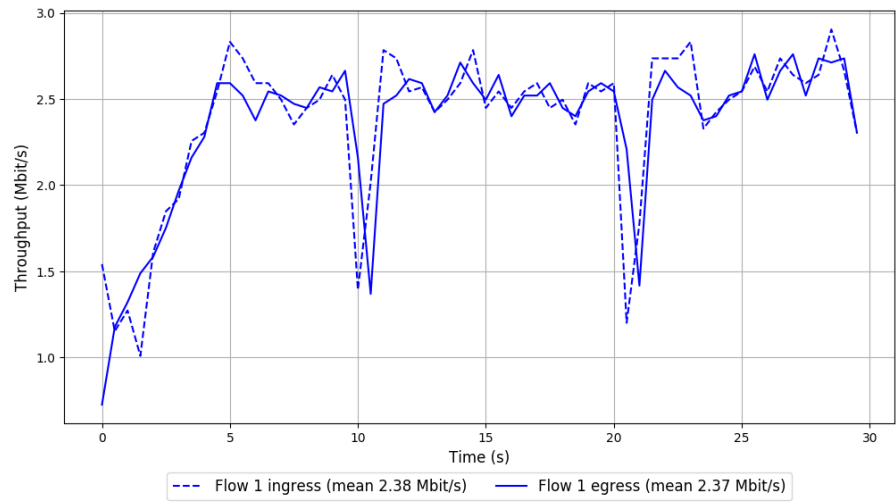| scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	2.36	260.82	0.89
TCP Cubic	3	2.40	355.62	1.97
LEDBAT	3	2.25	200.12	1.00
PCC	3	1.93	353.17	29.30
QUIC Cubic	3	2.45	357.40	2.02
SCReAM	2	0.22	83.63	0.20
WebRTC media	2	0.84	137.83	0.72
Sprout	3	0.33	102.37	0.32
TaoVA-100x	3	2.38	210.11	1.37
TCP Vegas	3	2.24	139.84	0.41
Verus	3	2.42	369.54	18.07
Copa	3	2.06	147.56	0.56
Indigo	2	2.05	107.51	0.44
Indigo-calib	3	0.95	192.49	5.04

```
Run 1: Statistics of TCP BBR

Start at: 2017-11-20 21:45:49
End at: 2017-11-20 21:46:19
Local clock offset: 4.91 ms
Remote clock offset: -13.346 ms

# Below is generated by plot.py at 2017-11-20 23:23:55
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 282.374 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 282.374 ms
Loss rate: 0.92%
```

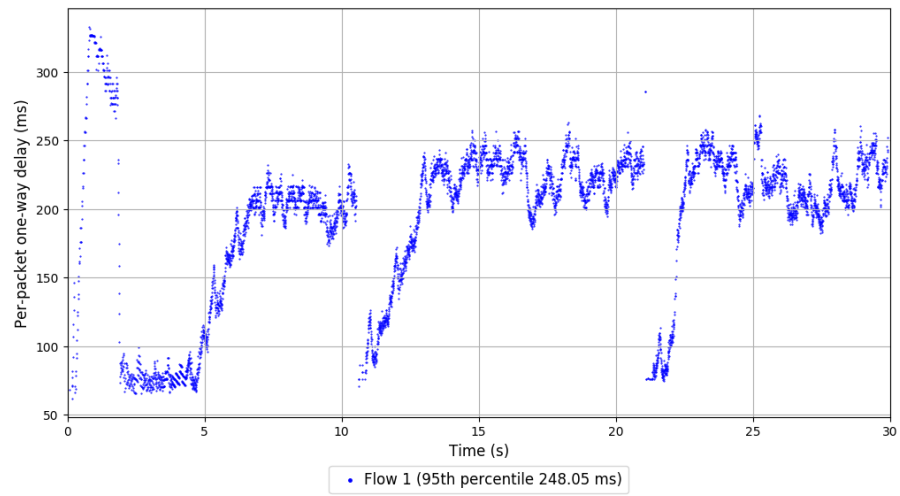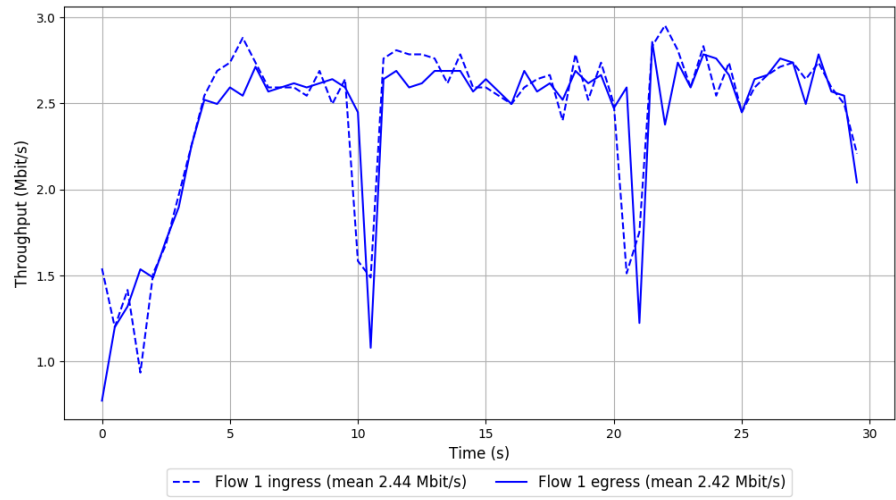Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-11-20 22:02:54
End at: 2017-11-20 22:03:24
Local clock offset: 5.676 ms
Remote clock offset: -14.533 ms


# Below is generated by plot.py at 2017-11-20 23:23:56
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 252.034 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 2.37 Mbit/s
95th percentile per-packet one-way delay: 252.034 ms
Loss rate: 0.86%
```
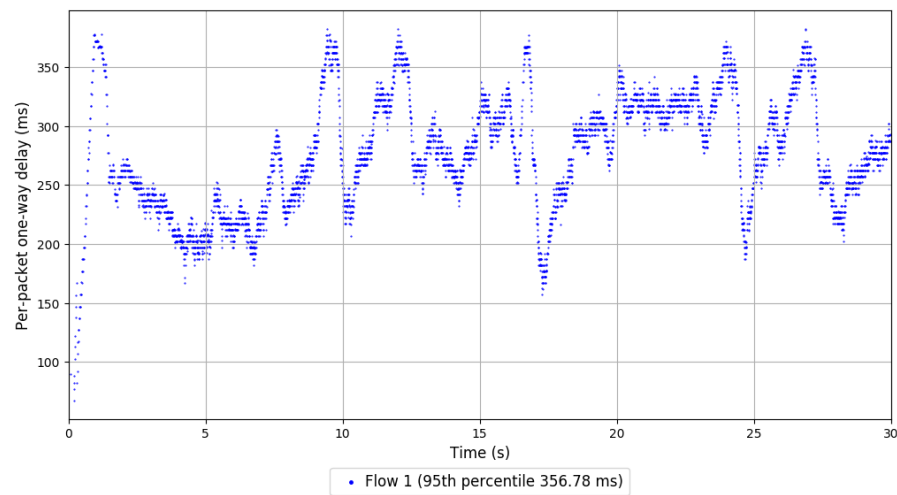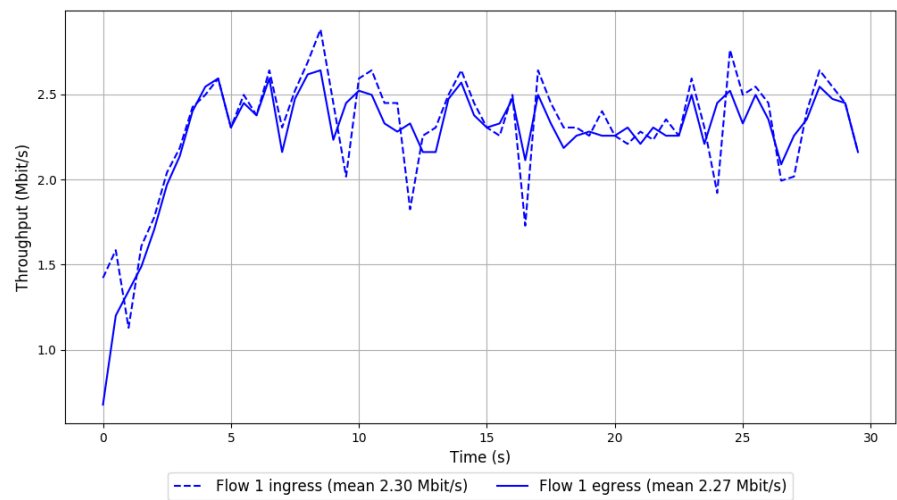
Run 2: Report of TCP BBR — Data Link

Flow 1 ingress (mean 2.38 Mbit/s)   Flow 1 egress (mean 2.37 Mbit/s)

• Flow 1 (95th percentile 252.03 ms)

```
Run 3: Statistics of TCP BBR

Start at: 2017-11-20 22:20:59
End at: 2017-11-20 22:21:29
Local clock offset: 6.536 ms
Remote clock offset: -13.421 ms

# Below is generated by plot.py at 2017-11-20 23:23:56
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 248.046 ms
Loss rate: 0.89%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 248.046 ms
Loss rate: 0.89%
```

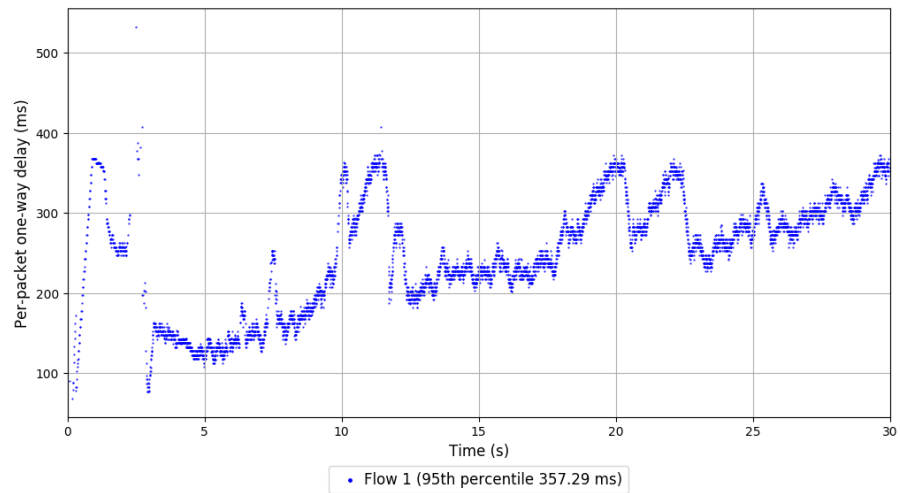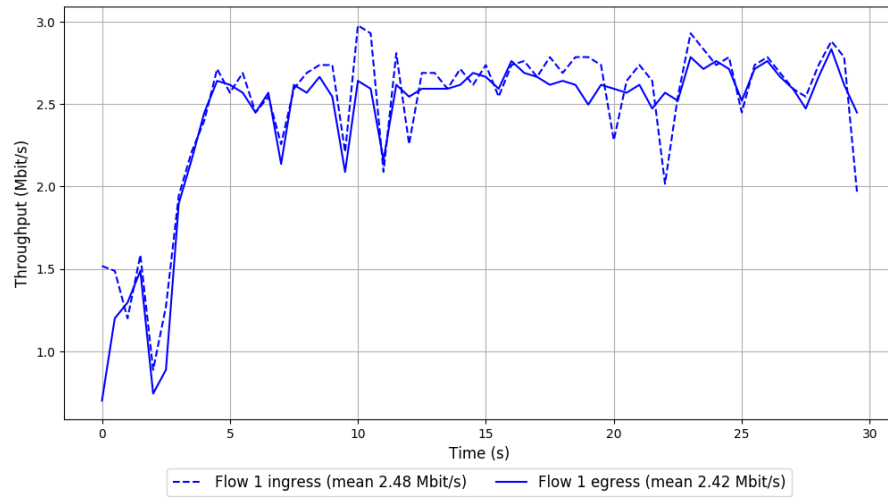Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 2.44 Mbit/s) --- Flow 1 egress (mean 2.42 Mbit/s)

• Flow 1 (95th percentile 248.05 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2017-11-20 21:54:40
End at: 2017-11-20 21:55:11
Local clock offset: 9.586 ms
Remote clock offset: -12.944 ms

# Below is generated by plot.py at 2017-11-20 23:23:56
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 356.783 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 356.783 ms
Loss rate: 1.60%
```
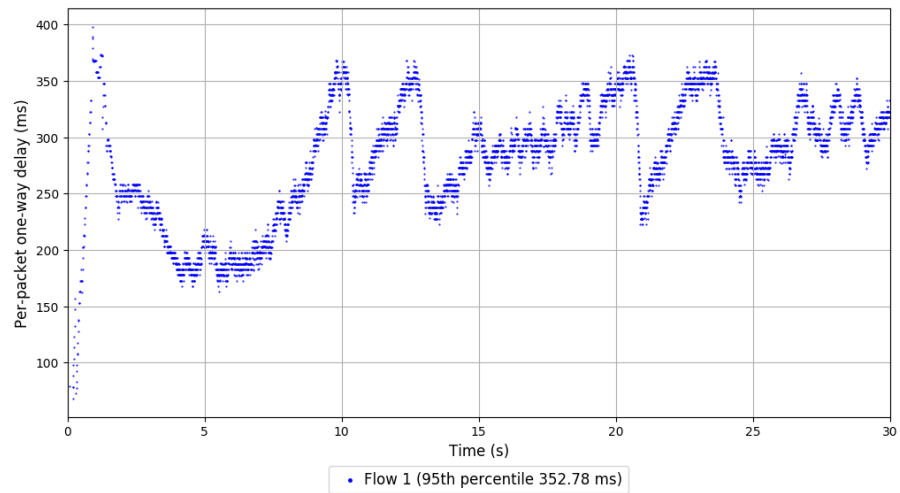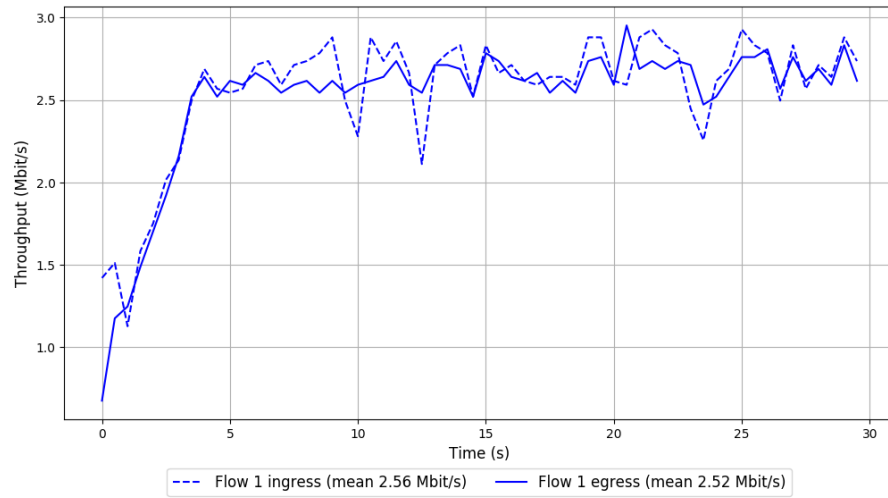
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 2.30 Mbit/s)   Flow 1 egress (mean 2.27 Mbit/s)

Flow 1 (95th percentile 356.78 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2017-11-20 22:11:38
End at: 2017-11-20 22:12:08
Local clock offset: 10.093 ms
Remote clock offset: -14.581 ms


# Below is generated by plot.py at 2017-11-20 23:23:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 357.285 ms
Loss rate: 2.49%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 357.285 ms
Loss rate: 2.49%
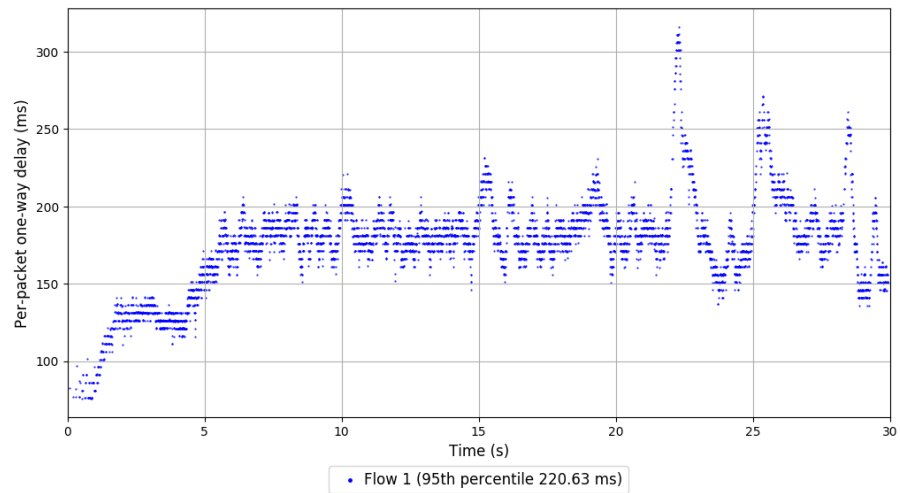```
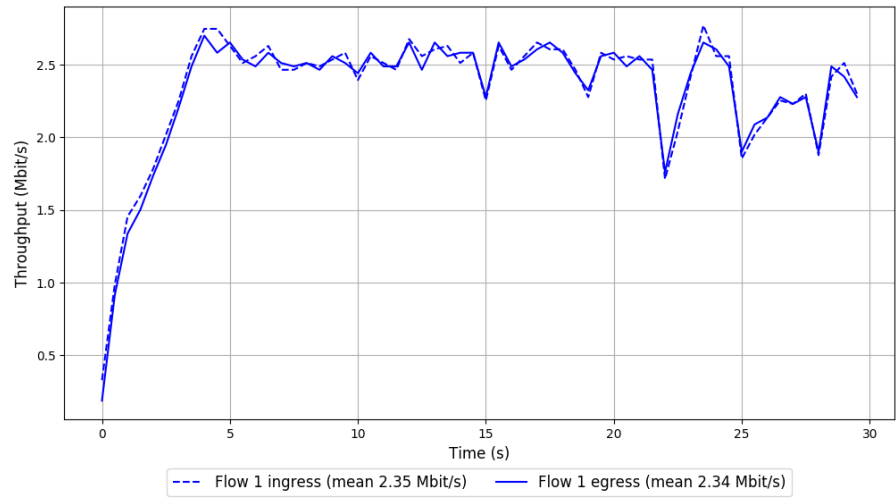
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2017-11-20 22:29:07
End at: 2017-11-20 22:29:37
Local clock offset: 6.291 ms
Remote clock offset: -14.145 ms


# Below is generated by plot.py at 2017-11-20 23:23:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 352.783 ms
Loss rate: 1.83%
-- Flow 1:
Average throughput: 2.52 Mbit/s
95th percentile per-packet one-way delay: 352.783 ms
Loss rate: 1.83%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 2.56 Mbit/s)   Flow 1 egress (mean 2.52 Mbit/s)

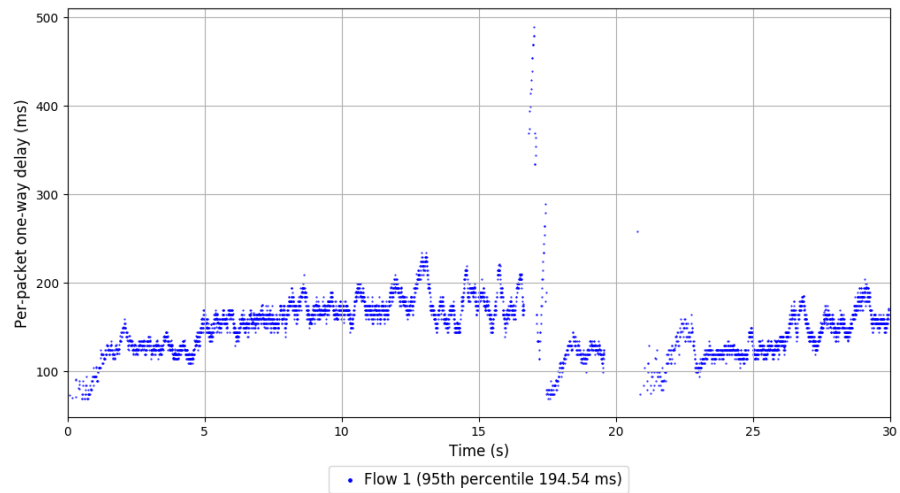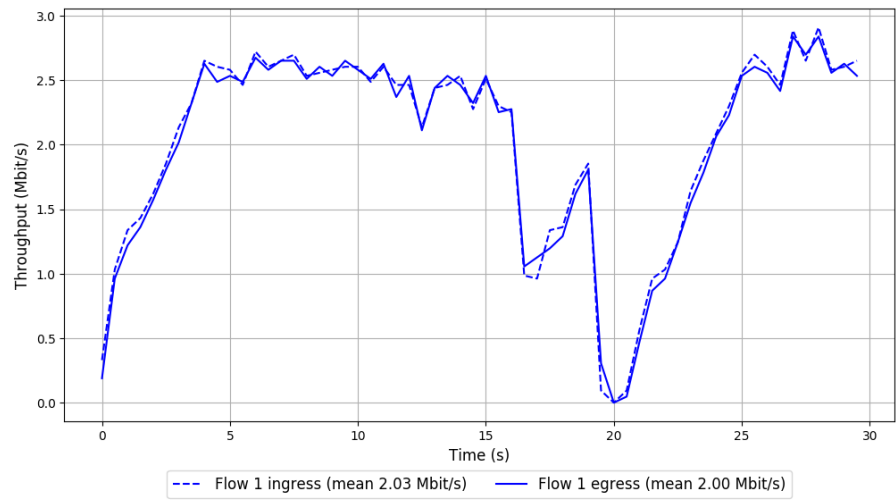Flow 1 (95th percentile 352.78 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2017-11-20 21:47:00
End at: 2017-11-20 21:47:30
Local clock offset: 4.607 ms
Remote clock offset: -12.949 ms

# Below is generated by plot.py at 2017-11-20 23:23:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 220.626 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 220.626 ms
Loss rate: 0.60%
```

Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.35 Mbit/s) --- Flow 1 egress (mean 2.34 Mbit/s)

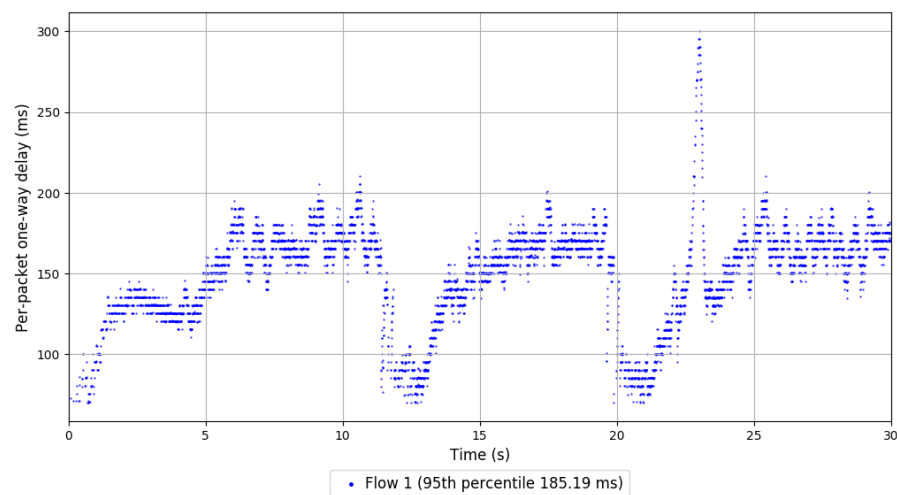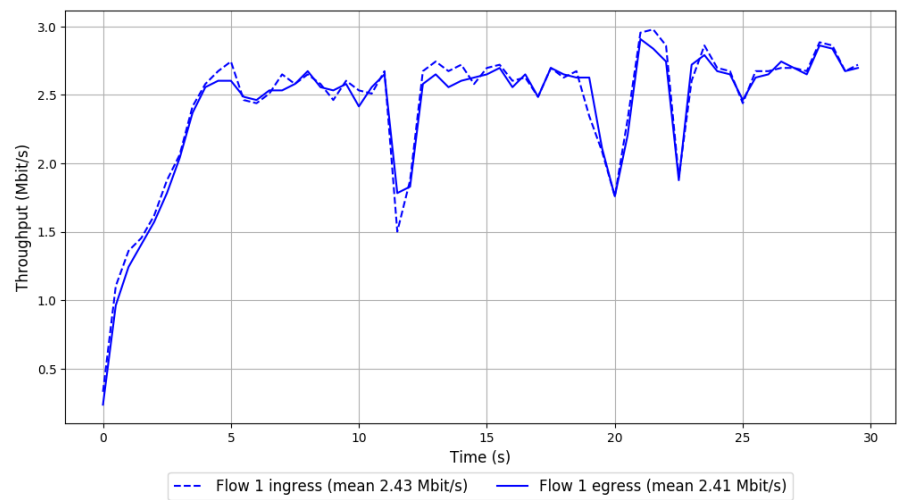• Flow 1 (95th percentile 220.63 ms)

```
Run 2: Statistics of LEDBAT

Start at: 2017-11-20 22:04:08
End at: 2017-11-20 22:04:38
Local clock offset: 4.894 ms
Remote clock offset: -13.124 ms


# Below is generated by plot.py at 2017-11-20 23:23:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 194.545 ms
Loss rate: 1.41%
-- Flow 1:
Average throughput: 2.00 Mbit/s
95th percentile per-packet one-way delay: 194.545 ms
Loss rate: 1.41%
```

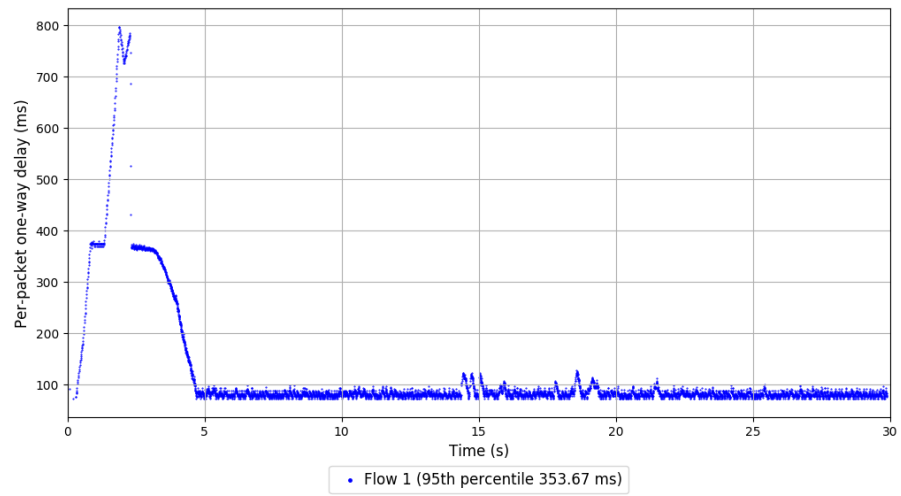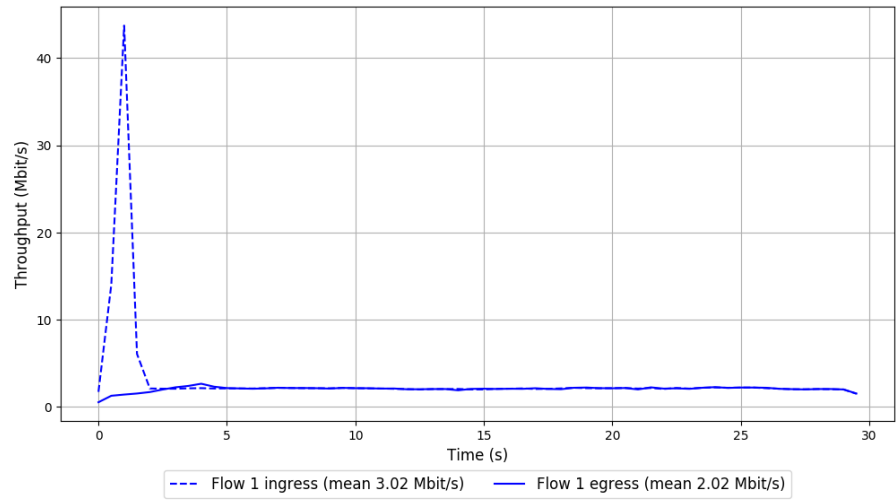Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.03 Mbit/s)   Flow 1 egress (mean 2.00 Mbit/s)

• Flow 1 (95th percentile 194.54 ms)

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```
Run 3: Statistics of LEDBAT

Start at: 2017-11-20 22:22:09
End at: 2017-11-20 22:22:39
Local clock offset: 6.411 ms
Remote clock offset: -13.678 ms

# Below is generated by plot.py at 2017-11-20 23:24:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 185.190 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 185.190 ms
Loss rate: 0.98%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.43 Mbit/s)   Flow 1 egress (mean 2.41 Mbit/s)

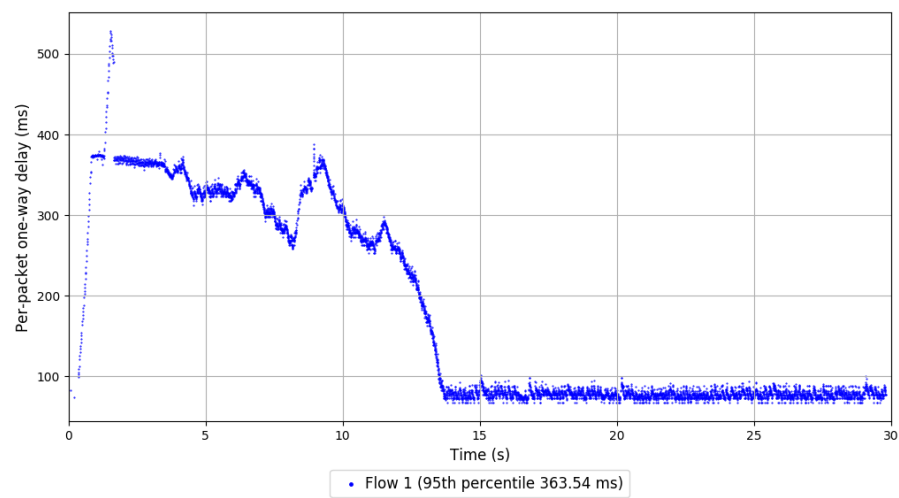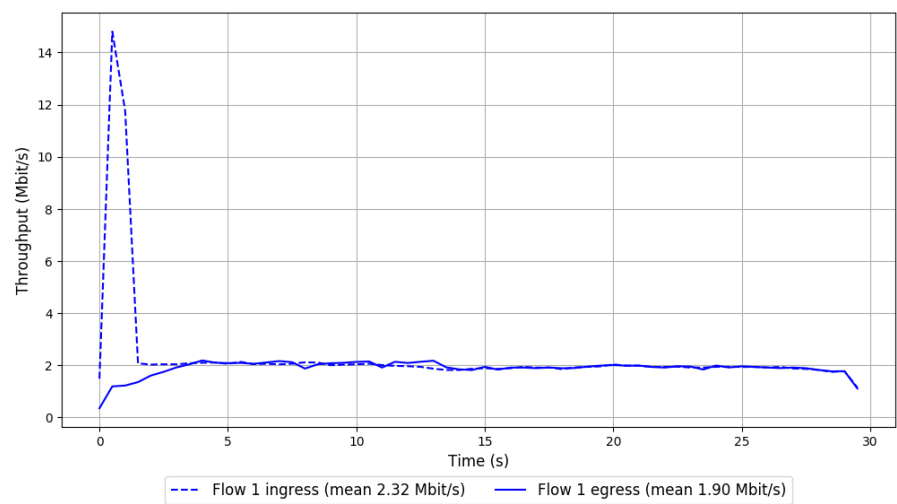Flow 1 (95th percentile 185.19 ms)

```
Run 1: Statistics of PCC

Start at: 2017-11-20 21:58:09
End at: 2017-11-20 21:58:39
Local clock offset: 10.375 ms
Remote clock offset: -14.288 ms


# Below is generated by plot.py at 2017-11-20 23:24:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 353.674 ms
Loss rate: 33.35%
-- Flow 1:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 353.674 ms
Loss rate: 33.35%
```

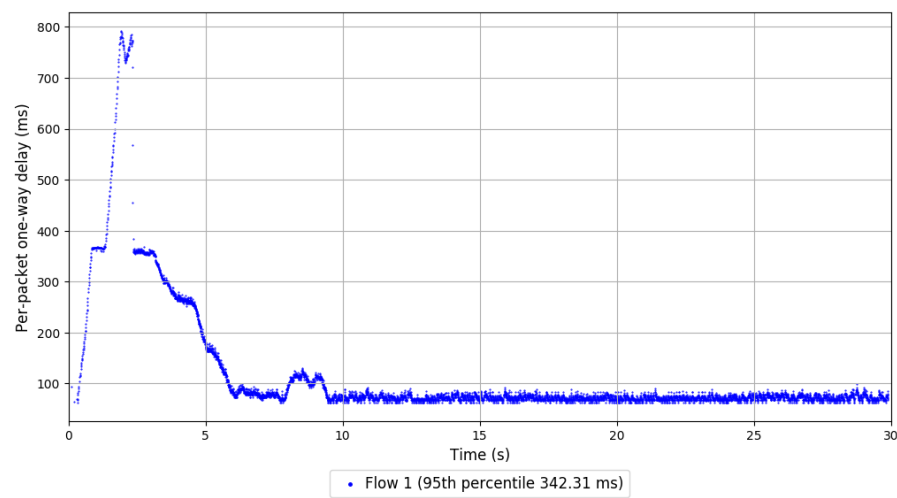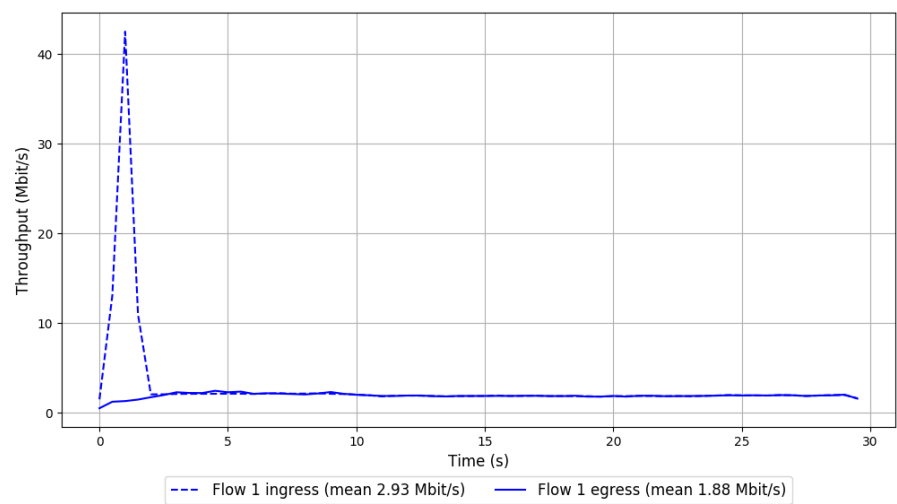# Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 3.02 Mbit/s) — Flow 1 egress (mean 2.02 Mbit/s)

Flow 1 (95th percentile 353.67 ms)

```
Run 2: Statistics of PCC

Start at: 2017-11-20 22:16:21
End at: 2017-11-20 22:16:51
Local clock offset: 8.965 ms
Remote clock offset: -12.888 ms


# Below is generated by plot.py at 2017-11-20 23:24:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 363.537 ms
Loss rate: 18.61%
-- Flow 1:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 363.537 ms
Loss rate: 18.61%
```
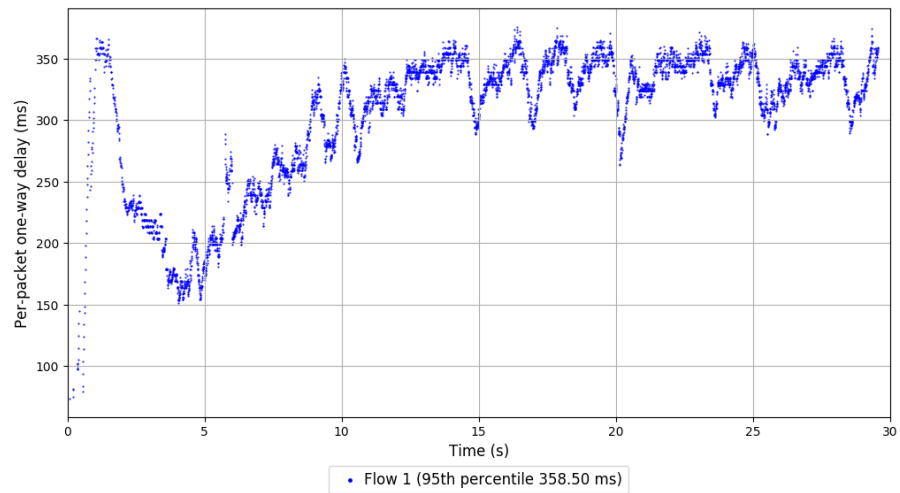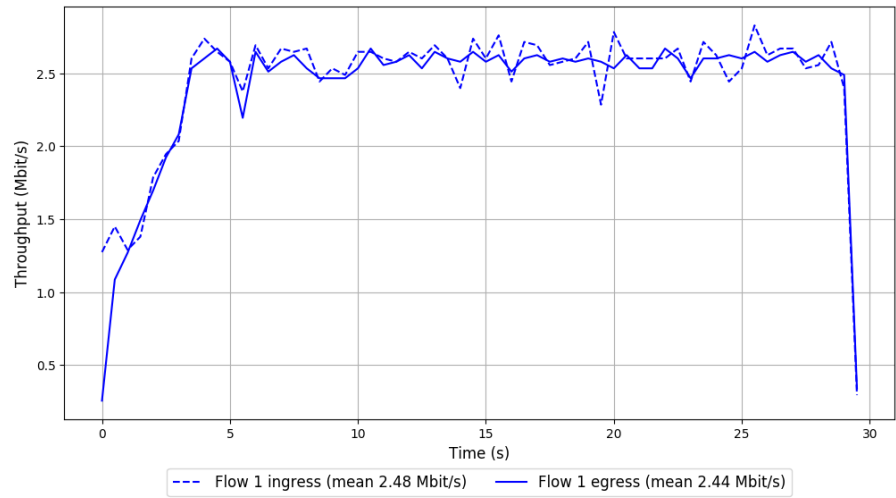
Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 2.32 Mbit/s) — — — Flow 1 egress (mean 1.90 Mbit/s)

• Flow 1 (95th percentile 363.54 ms)

```
Run 3: Statistics of PCC

Start at: 2017-11-20 22:32:37
End at: 2017-11-20 22:33:07
Local clock offset: 6.821 ms
Remote clock offset: -14.53 ms

# Below is generated by plot.py at 2017-11-20 23:24:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 342.305 ms
Loss rate: 35.94%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 342.305 ms
Loss rate: 35.94%
```

Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 2.93 Mbit/s) --- Flow 1 egress (mean 1.88 Mbit/s)
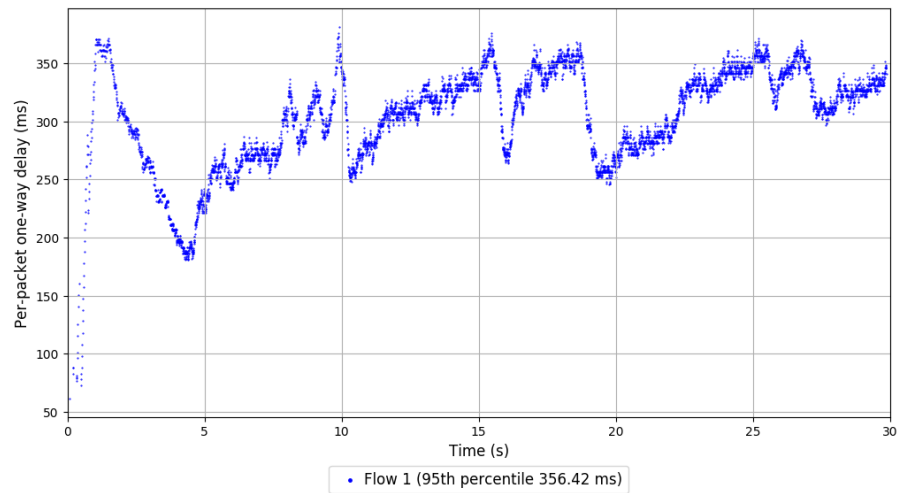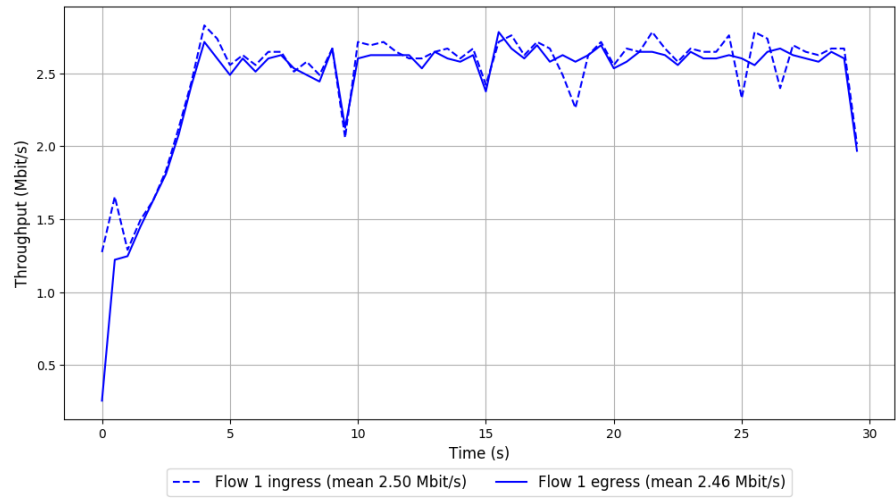

Flow 1 (95th percentile 342.31 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-11-20 21:44:41
End at: 2017-11-20 21:45:11
Local clock offset: 4.484 ms
Remote clock offset: -13.638 ms

# Below is generated by plot.py at 2017-11-20 23:24:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 358.504 ms
Loss rate: 1.91%
-- Flow 1:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 358.504 ms
Loss rate: 1.91%
```
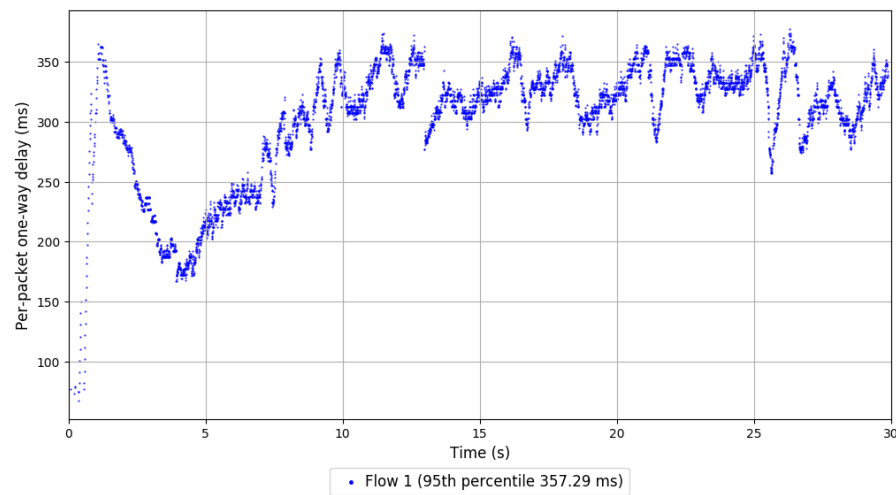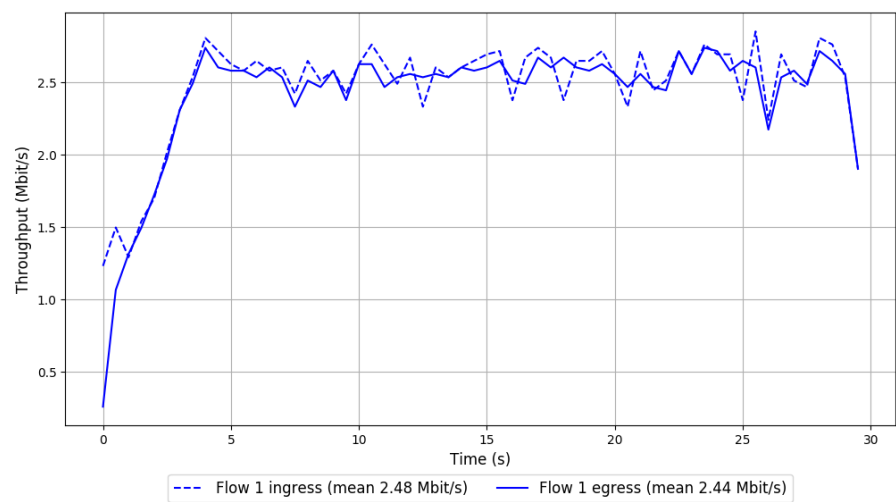
Run 1: Report of QUIC Cubic — Data Link
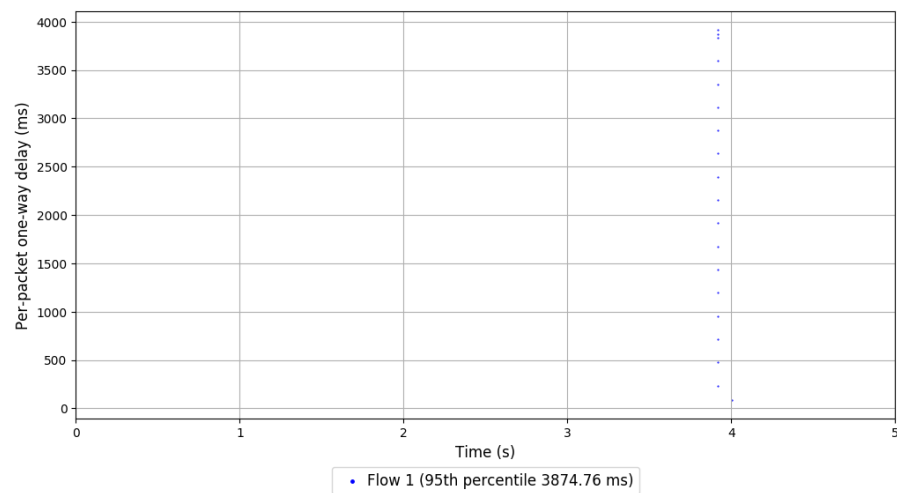
```
Run 2: Statistics of QUIC Cubic

Start at: 2017-11-20 22:01:45
End at: 2017-11-20 22:02:15
Local clock offset: 6.279 ms
Remote clock offset: -12.799 ms


# Below is generated by plot.py at 2017-11-20 23:24:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 356.415 ms
Loss rate: 2.01%
-- Flow 1:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 356.415 ms
Loss rate: 2.01%
```

Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 2.50 Mbit/s)   Flow 1 egress (mean 2.46 Mbit/s)

Flow 1 (95th percentile 356.42 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-11-20 22:19:49
End at: 2017-11-20 22:20:19
Local clock offset: 5.84 ms
Remote clock offset: -15.209 ms


# Below is generated by plot.py at 2017-11-20 23:24:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 357.288 ms
Loss rate: 2.15%
-- Flow 1:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 357.288 ms
Loss rate: 2.15%
```

Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 2.48 Mbit/s) --- Flow 1 egress (mean 2.44 Mbit/s)

Flow 1 (95th percentile 357.29 ms)

```
Run 1: Statistics of SCReAM

Start at: 2017-11-20 21:49:20
End at: 2017-11-20 21:49:50
Local clock offset: 4.911 ms
Remote clock offset: -14.626 ms
```
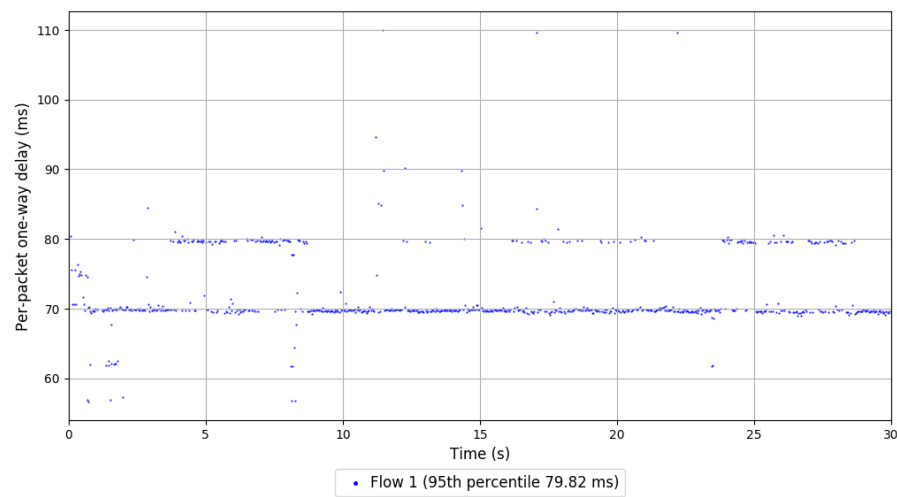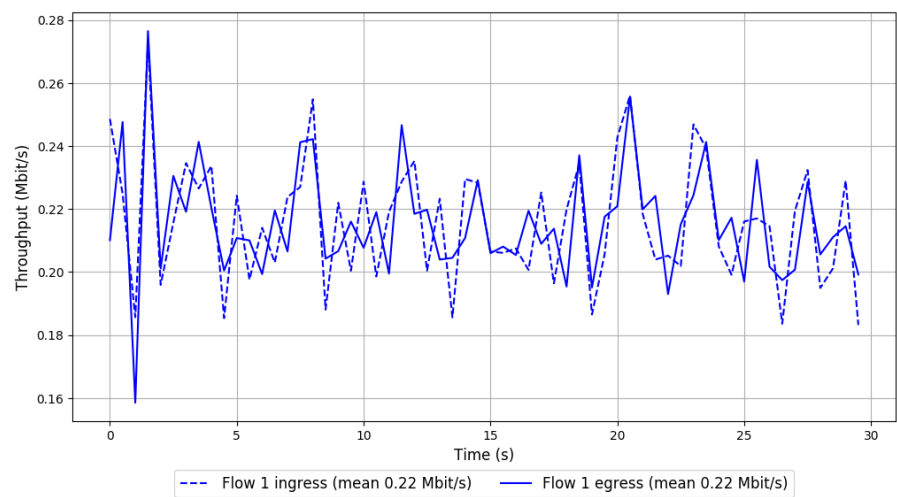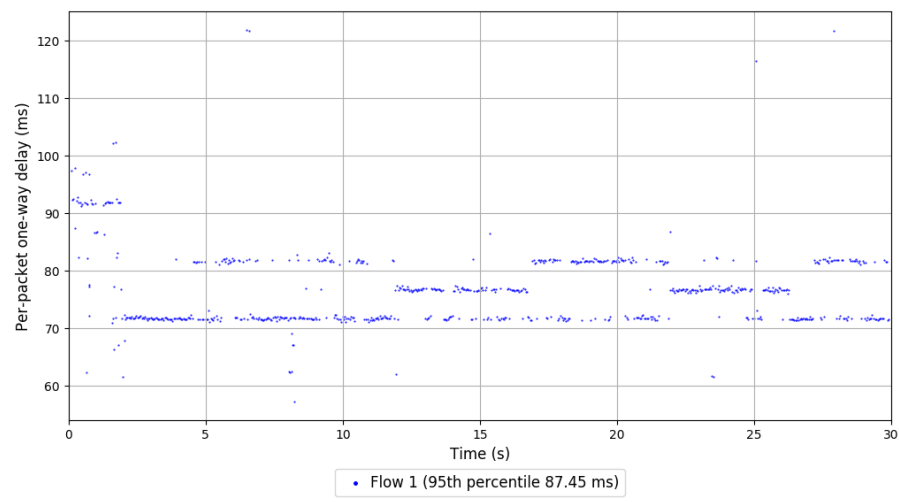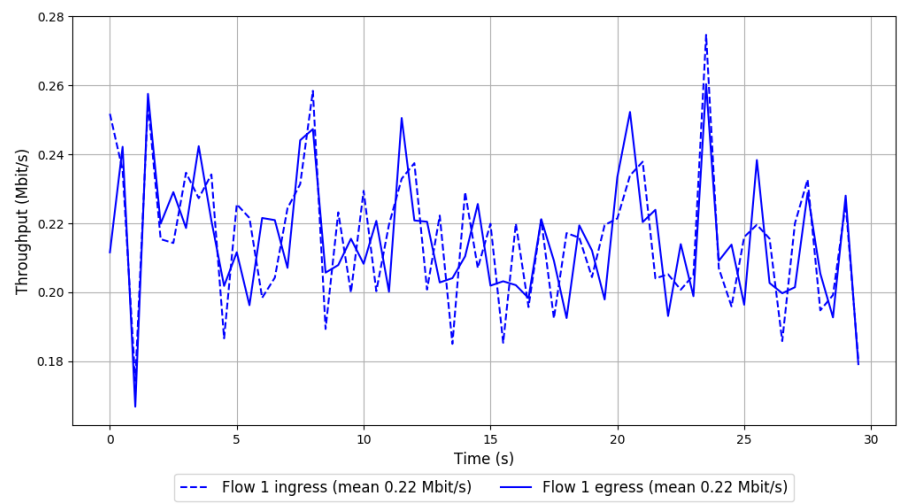
Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2017-11-20 22:06:57
End at: 2017-11-20 22:07:27
Local clock offset: 9.534 ms
Remote clock offset: -12.209 ms

# Below is generated by plot.py at 2017-11-20 23:24:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 79.821 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 79.821 ms
Loss rate: 0.13%
```
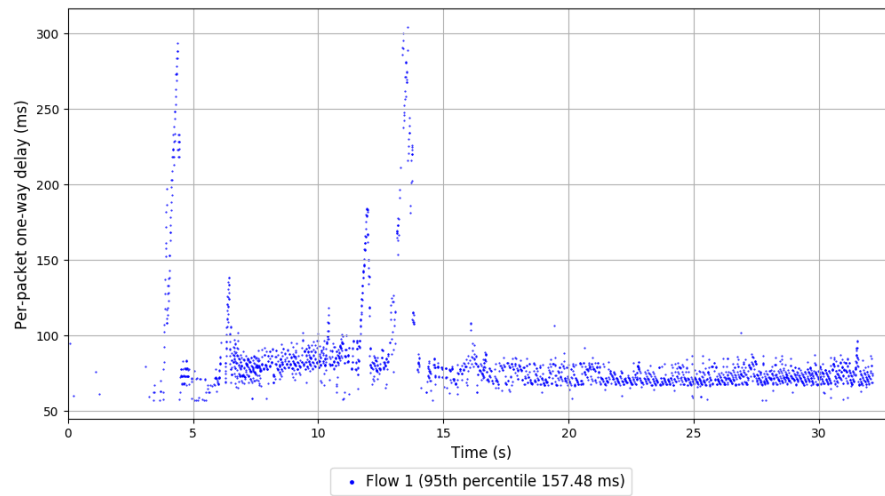
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2017-11-20 22:24:28
End at: 2017-11-20 22:24:58
Local clock offset: 8.646 ms
Remote clock offset: -13.628 ms


# Below is generated by plot.py at 2017-11-20 23:24:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 87.449 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 87.449 ms
Loss rate: 0.26%
```

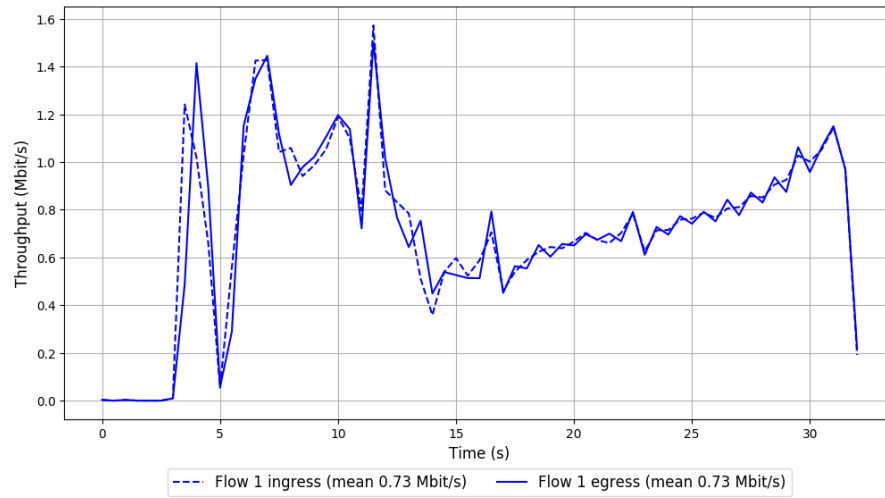Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2017-11-20 21:50:41
End at: 2017-11-20 21:51:11
Local clock offset: 5.626 ms
Remote clock offset: -15.233 ms


# Below is generated by plot.py at 2017-11-20 23:24:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 157.478 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 157.478 ms
Loss rate: 0.53%
```

Run 1: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.73 Mbit/s)   Flow 1 egress (mean 0.73 Mbit/s)

Flow 1 (95th percentile 157.48 ms)
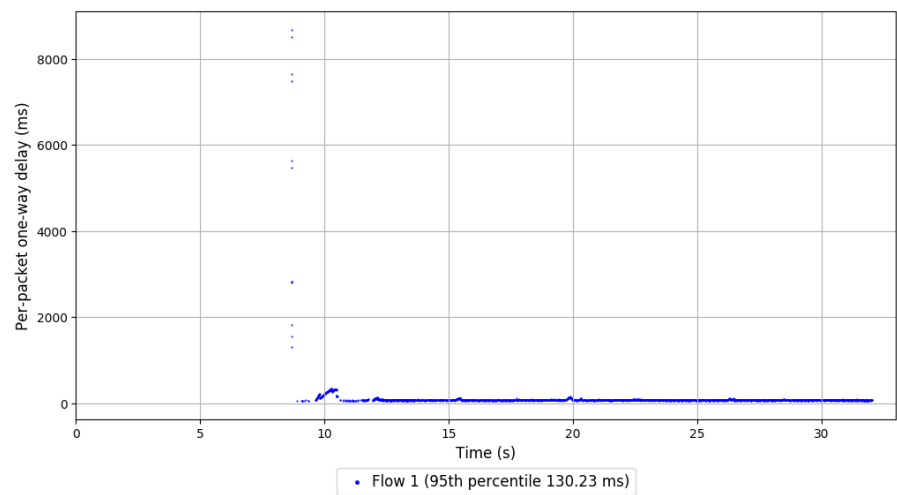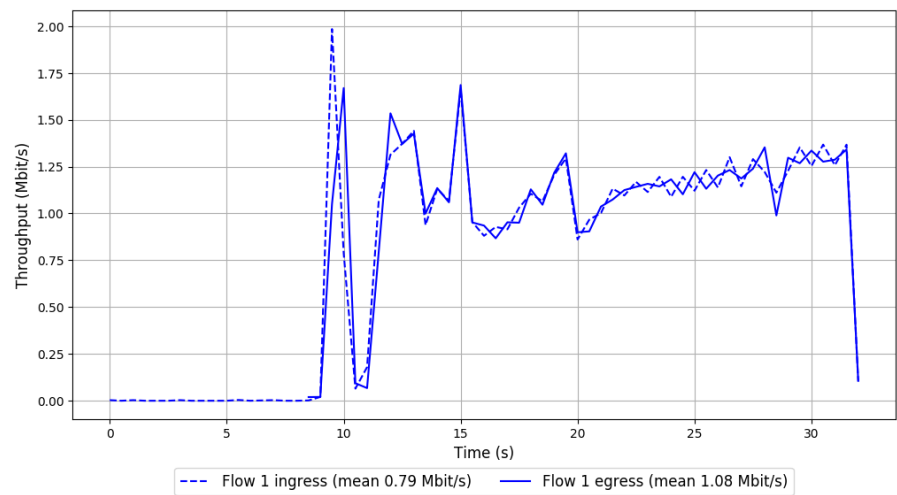
```
Run 2: Statistics of WebRTC media

Start at: 2017-11-20 22:08:05
End at: 2017-11-20 22:08:35
Local clock offset: 7.344 ms
Remote clock offset: -14.912 ms
```

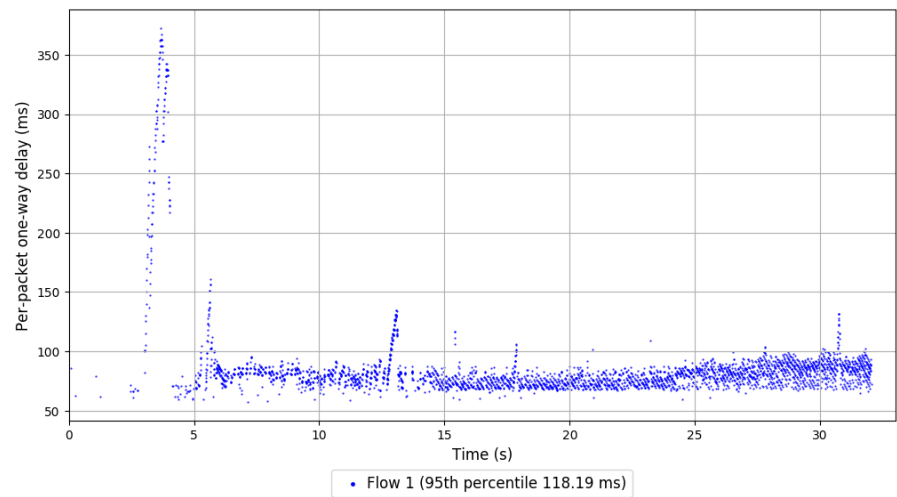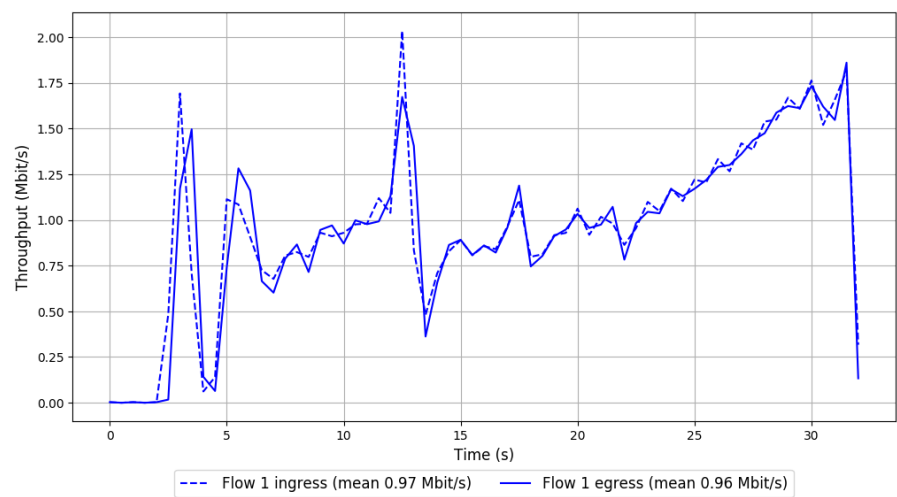Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2017-11-20 22:25:38
End at: 2017-11-20 22:26:08
Local clock offset: 6.886 ms
Remote clock offset: -15.414 ms


# Below is generated by plot.py at 2017-11-20 23:24:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 118.187 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 118.187 ms
Loss rate: 0.90%
```
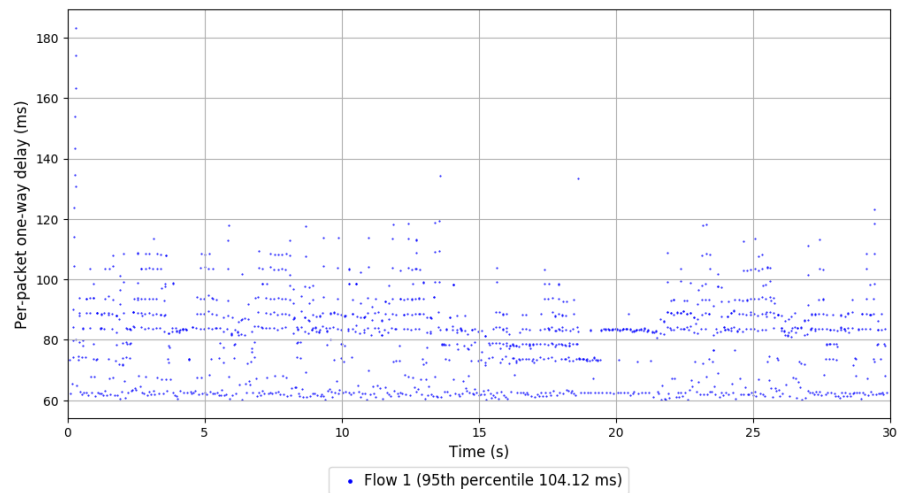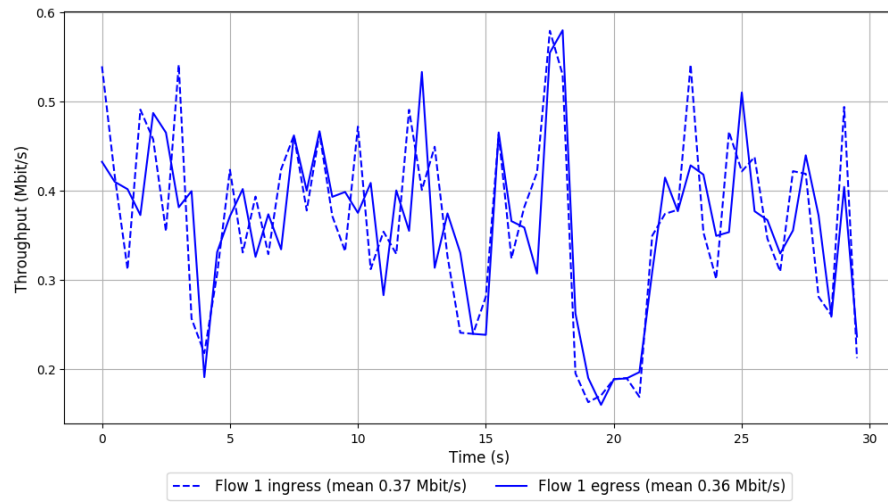
Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2017-11-20 21:57:01
End at: 2017-11-20 21:57:31
Local clock offset: 10.688 ms
Remote clock offset: -13.261 ms


# Below is generated by plot.py at 2017-11-20 23:24:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 104.120 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 104.120 ms
Loss rate: 0.32%
```

Run 1: Report of Sprout — Data Link

Flow 1 ingress (mean 0.37 Mbit/s)   Flow 1 egress (mean 0.36 Mbit/s)

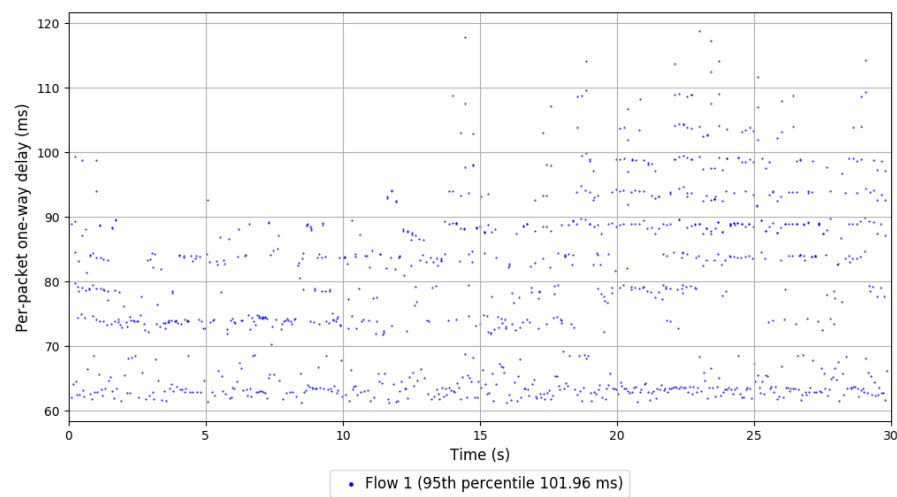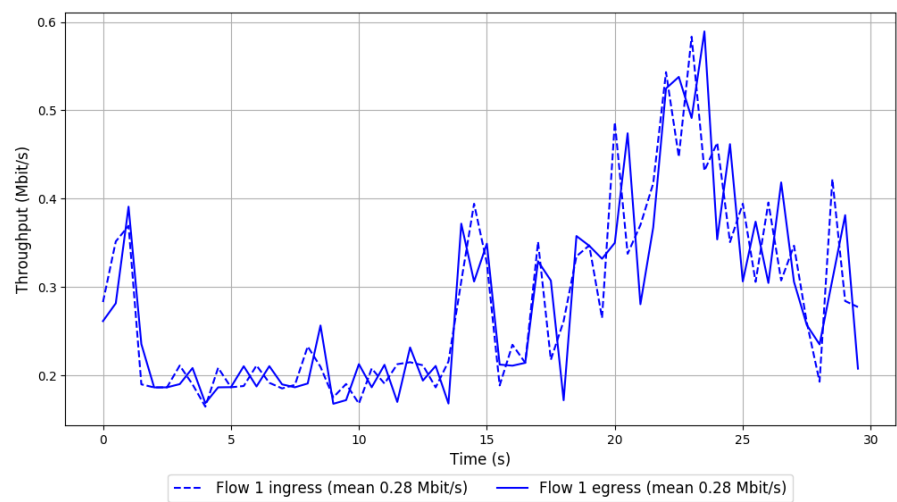Flow 1 (95th percentile 104.12 ms)

```
Run 2: Statistics of Sprout

Start at: 2017-11-20 22:15:12
End at: 2017-11-20 22:15:42
Local clock offset: 10.21 ms
Remote clock offset: -13.434 ms


# Below is generated by plot.py at 2017-11-20 23:24:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 101.956 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 101.956 ms
Loss rate: 0.53%
```

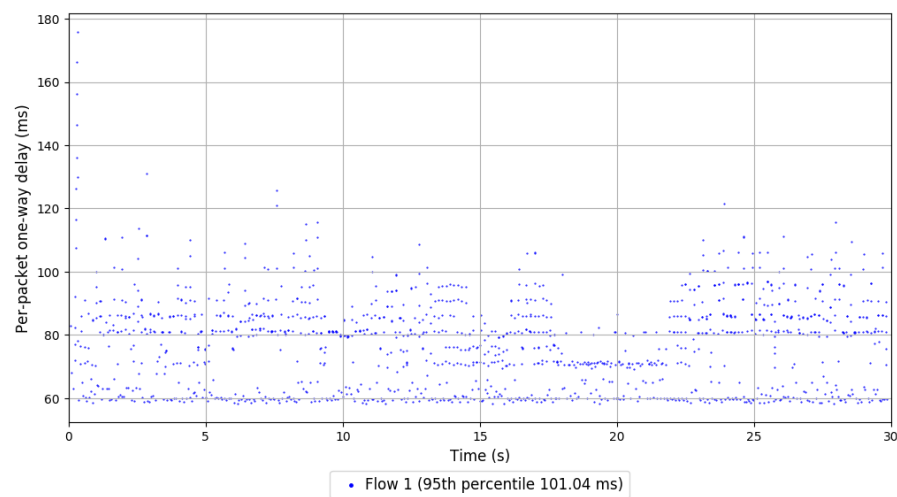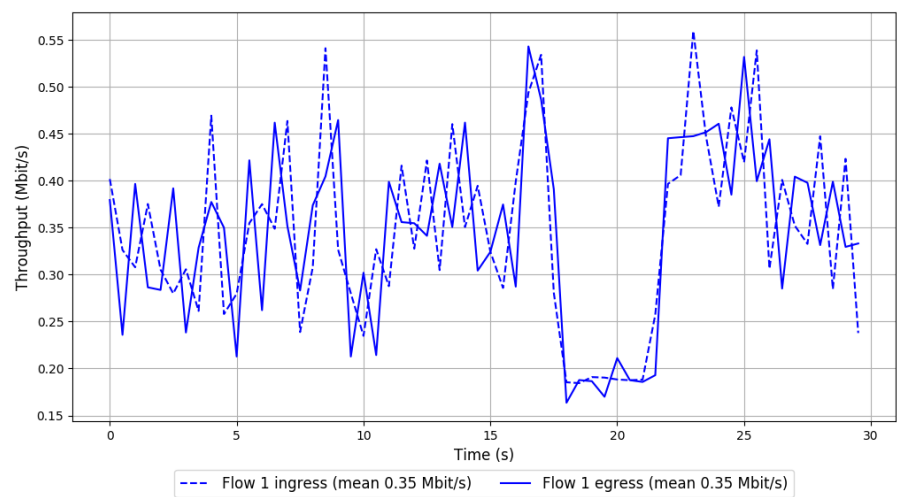## Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2017-11-20 22:31:28
End at: 2017-11-20 22:31:58
Local clock offset: 5.591 ms
Remote clock offset: -14.853 ms

# Below is generated by plot.py at 2017-11-20 23:24:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 101.042 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 101.042 ms
Loss rate: 0.11%
```

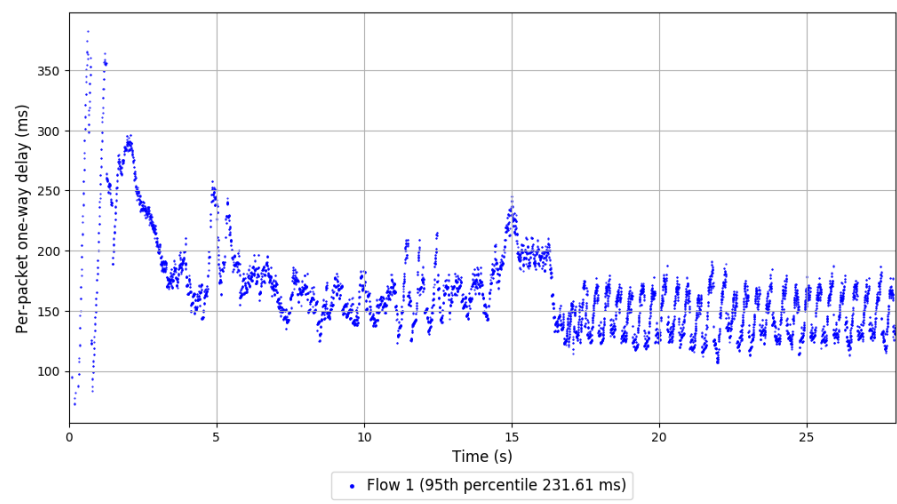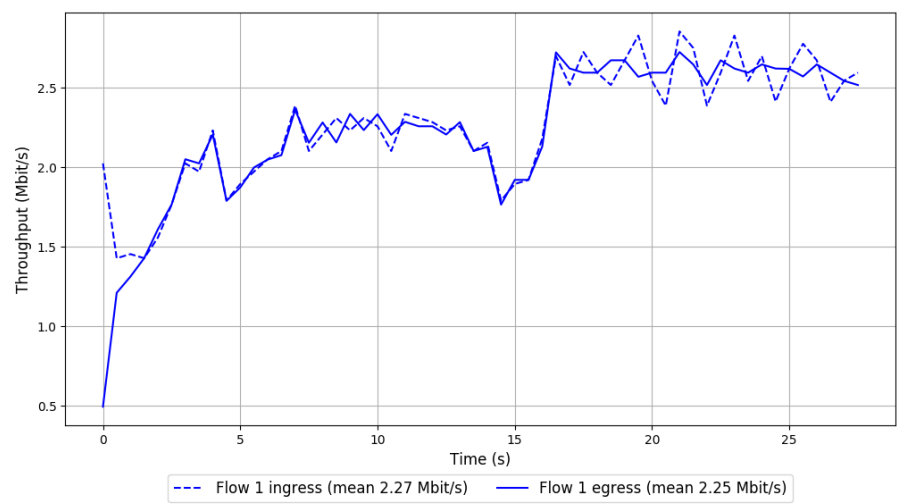Run 3: Report of Sprout — Data Link

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

Start at: 2017-11-20 21:59:20
End at: 2017-11-20 21:59:50
Local clock offset: 4.182 ms
Remote clock offset: -13.521 ms


# Below is generated by plot.py at 2017-11-20 23:24:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 231.607 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 2.25 Mbit/s
95th percentile per-packet one-way delay: 231.607 ms
Loss rate: 1.47%
```

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

Flow 1 ingress (mean 2.27 Mbit/s) --- Flow 1 egress (mean 2.25 Mbit/s)
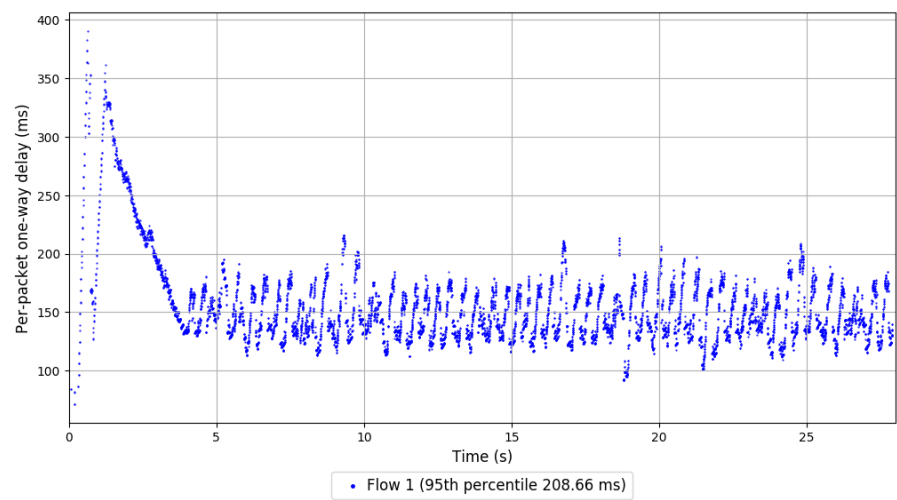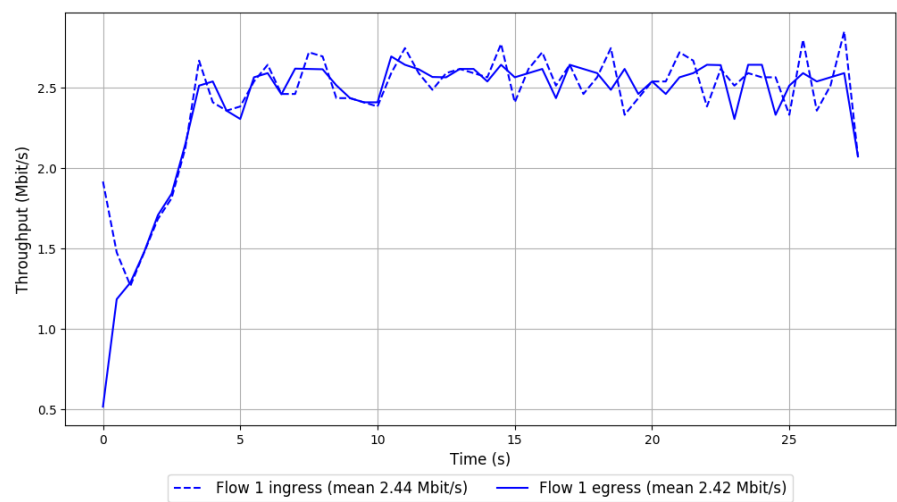

Flow 1 (95th percentile 231.61 ms)

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

Start at: 2017-11-20 22:17:31
End at: 2017-11-20 22:18:01
Local clock offset: 5.598 ms
Remote clock offset: -13.931 ms


# Below is generated by plot.py at 2017-11-20 23:24:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 208.659 ms
Loss rate: 1.40%
-- Flow 1:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 208.659 ms
Loss rate: 1.40%
```

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

Flow 1 ingress (mean 2.44 Mbit/s)   Flow 1 egress (mean 2.42 Mbit/s)

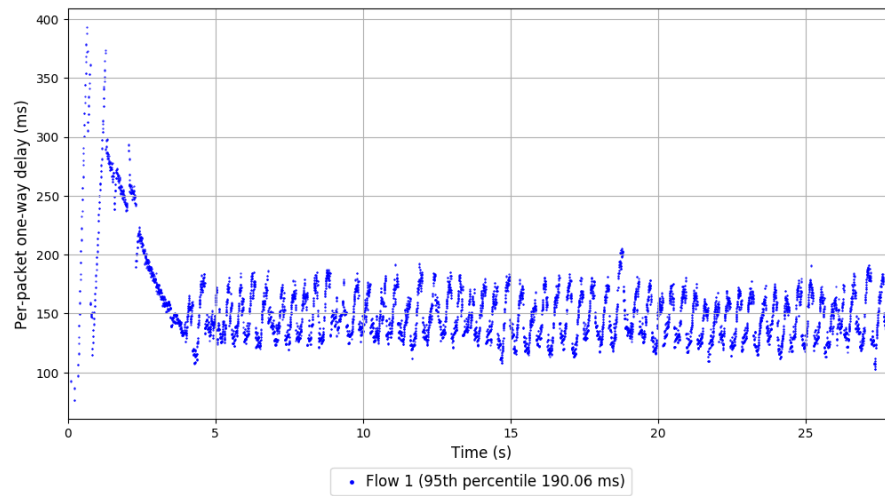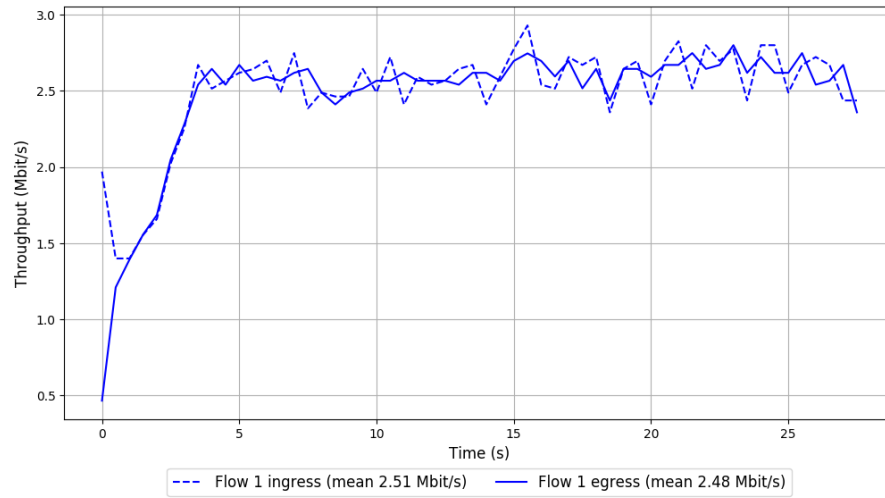

Flow 1 (95th percentile 208.66 ms)

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

Start at: 2017-11-20 22:33:54
End at: 2017-11-20 22:34:24
Local clock offset: 5.627 ms
Remote clock offset: -15.605 ms


# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 190.058 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 190.058 ms
Loss rate: 1.25%
```

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

Flow 1 ingress (mean 2.51 Mbit/s) --- Flow 1 egress (mean 2.48 Mbit/s)

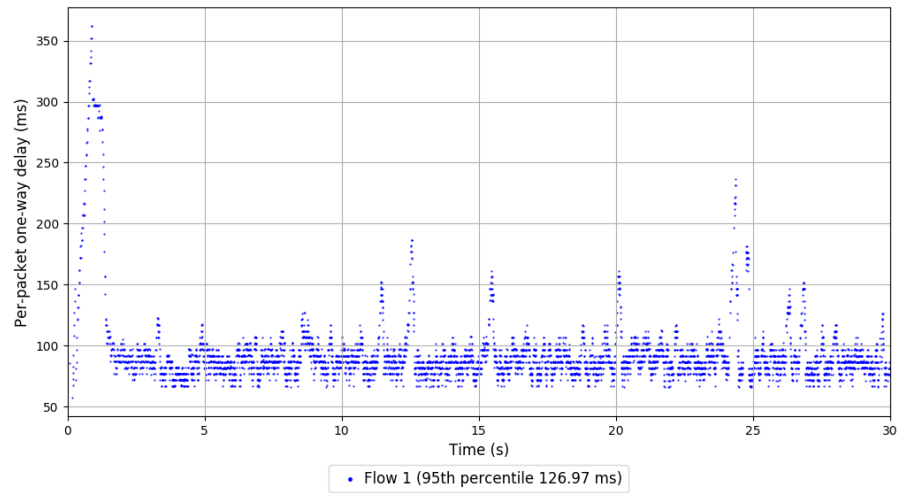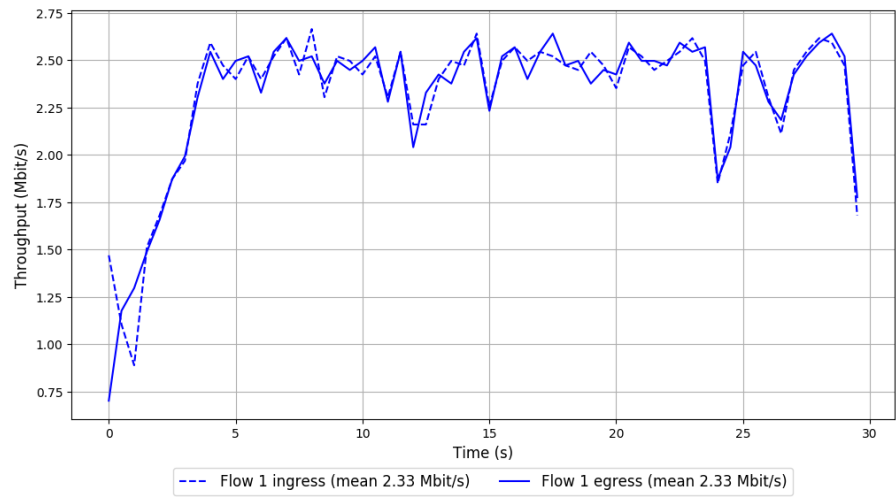
Flow 1 (95th percentile 190.06 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2017-11-20 21:48:10
End at: 2017-11-20 21:48:40
Local clock offset: 4.524 ms
Remote clock offset: -13.536 ms


# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 126.967 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 126.967 ms
Loss rate: 0.21%
```
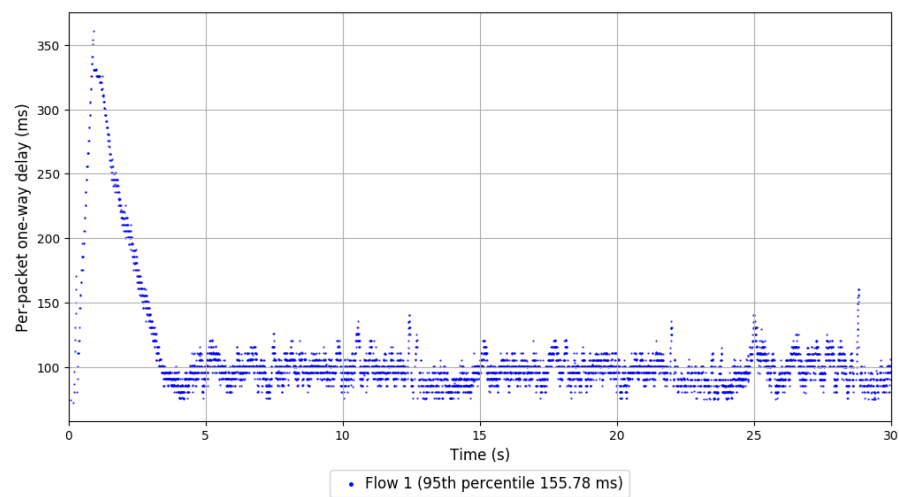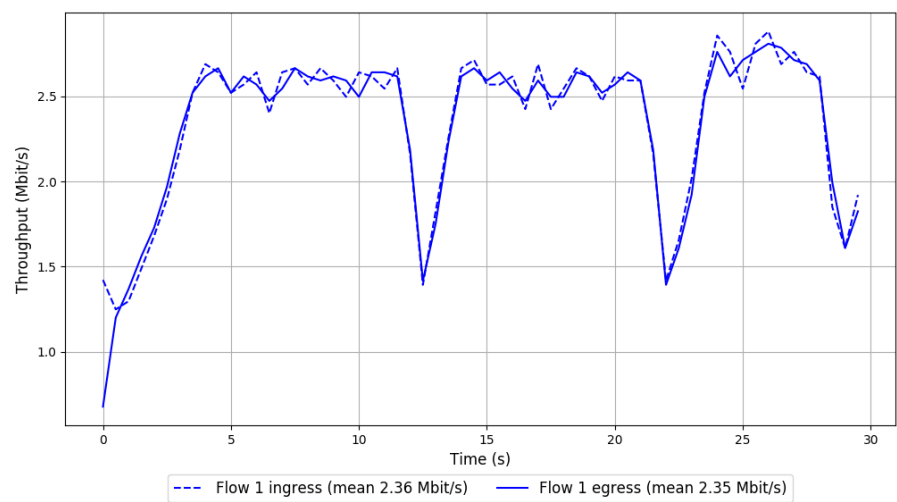
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-11-20 22:05:19
End at: 2017-11-20 22:05:49
Local clock offset: 10.22 ms
Remote clock offset: -14.724 ms


# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.35 Mbit/s
95th percentile per-packet one-way delay: 155.779 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 2.35 Mbit/s
95th percentile per-packet one-way delay: 155.779 ms
Loss rate: 0.61%
```
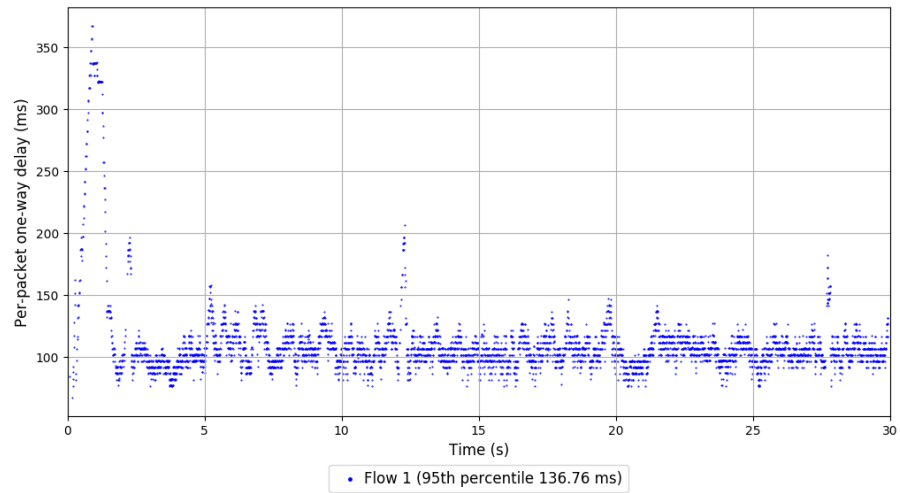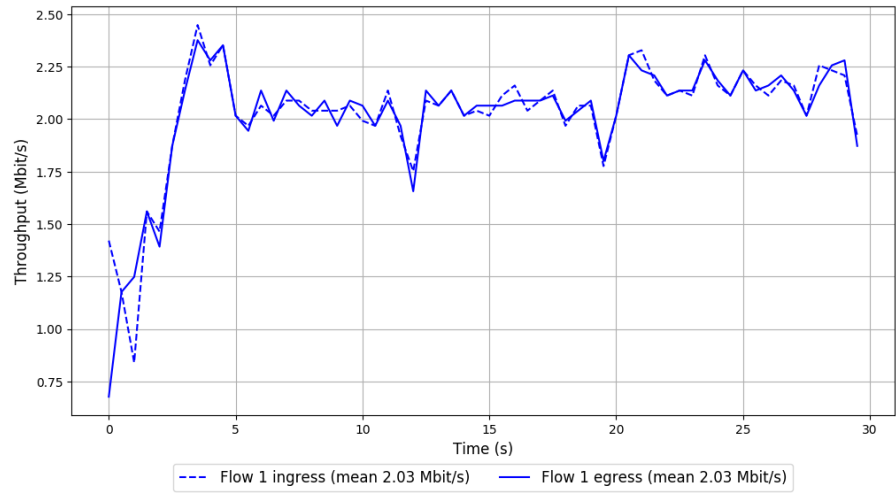
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2017-11-20 22:23:21
End at: 2017-11-20 22:23:51
Local clock offset: 8.056 ms
Remote clock offset: -14.056 ms

# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 136.765 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 136.765 ms
Loss rate: 0.41%
```
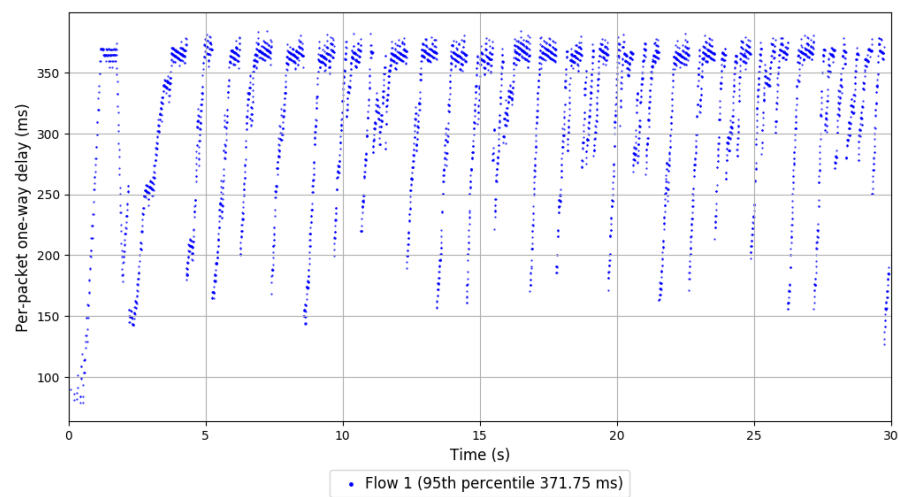
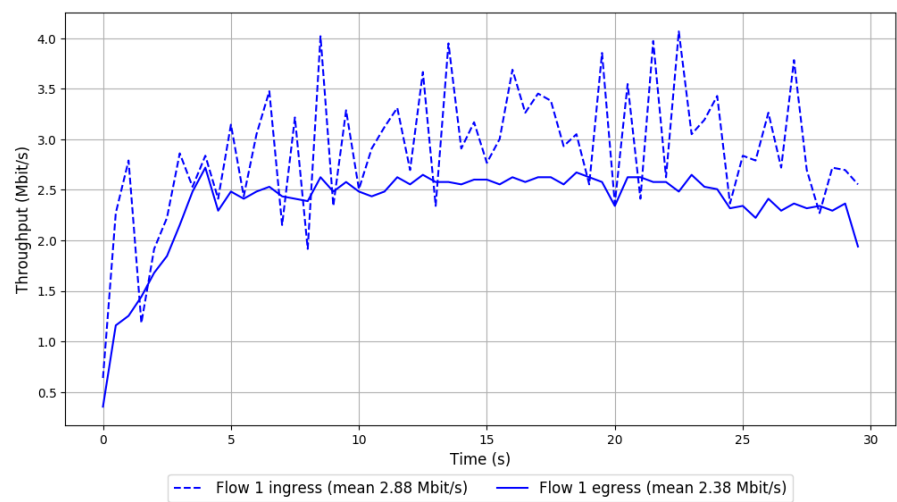Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2017-11-20 21:43:20
End at: 2017-11-20 21:43:50
Local clock offset: 0.802 ms
Remote clock offset: -20.848 ms


# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 371.746 ms
Loss rate: 17.77%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 371.746 ms
Loss rate: 17.77%
```
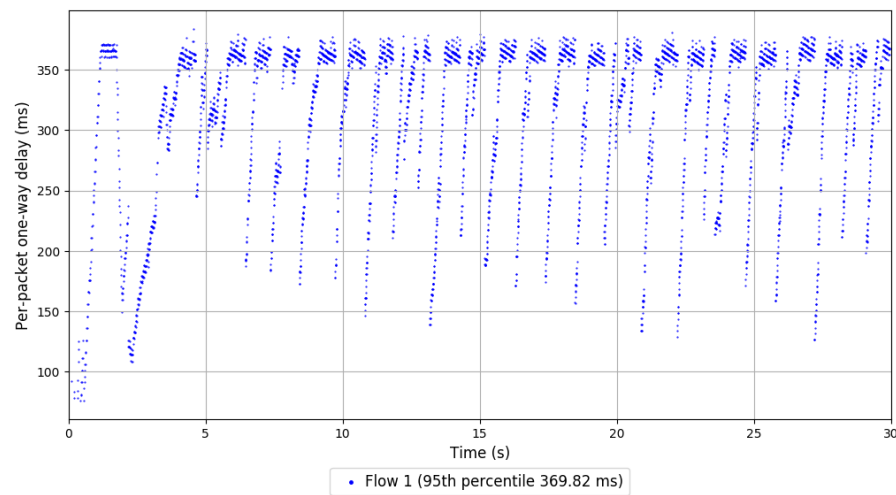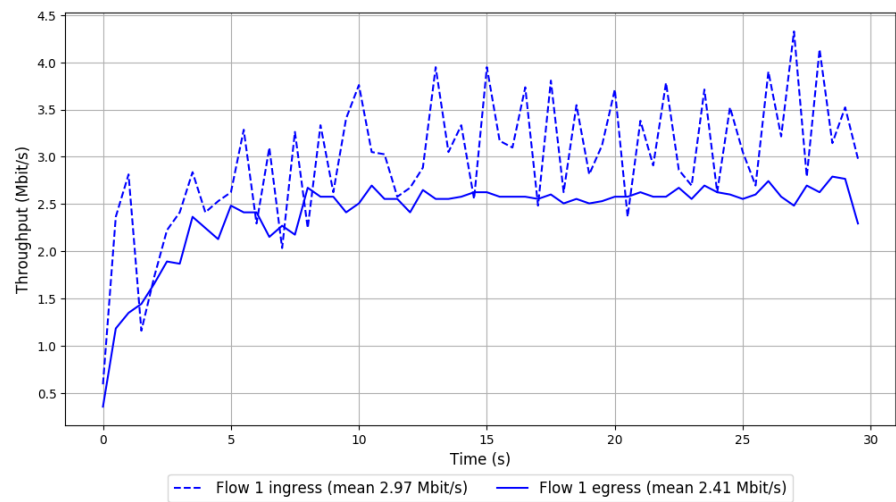
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2017-11-20 22:00:29
End at: 2017-11-20 22:00:59
Local clock offset: 3.555 ms
Remote clock offset: -14.026 ms


# Below is generated by plot.py at 2017-11-20 23:24:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 369.822 ms
Loss rate: 18.95%
-- Flow 1:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 369.822 ms
Loss rate: 18.95%
```

Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 2.97 Mbit/s) --- Flow 1 egress (mean 2.41 Mbit/s) ——
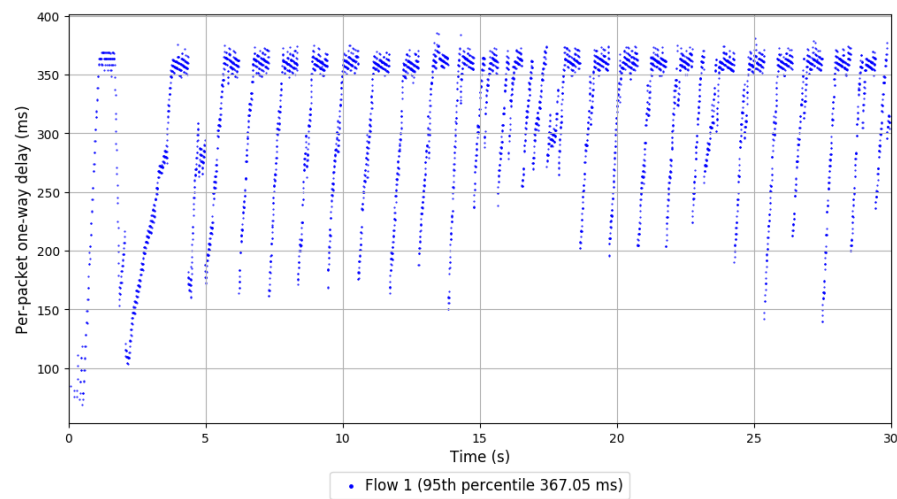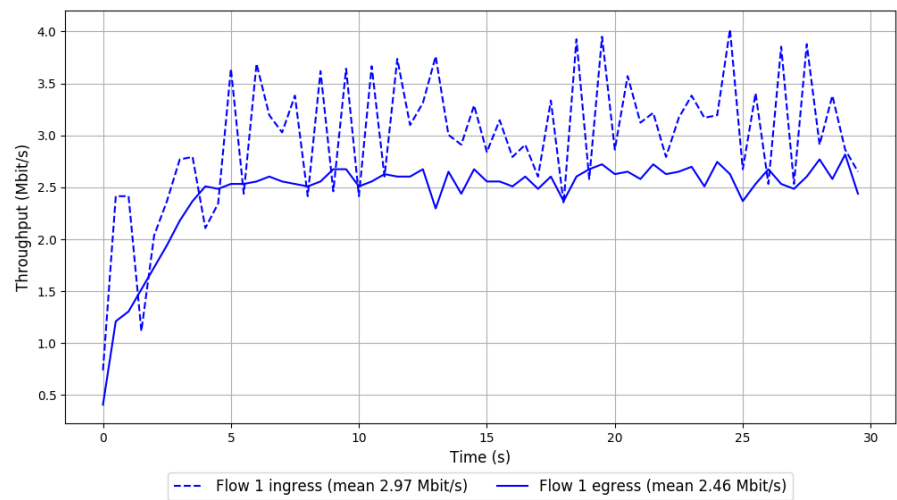

Flow 1 (95th percentile 369.82 ms)

```
Run 3: Statistics of Verus

Start at: 2017-11-20 22:18:40
End at: 2017-11-20 22:19:10
Local clock offset: 7.237 ms
Remote clock offset: -14.501 ms


# Below is generated by plot.py at 2017-11-20 23:24:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 367.048 ms
Loss rate: 17.50%
-- Flow 1:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 367.048 ms
Loss rate: 17.50%
```

Run 3: Report of Verus — Data Link

Flow 1 ingress (mean 2.97 Mbit/s)   Flow 1 egress (mean 2.46 Mbit/s)

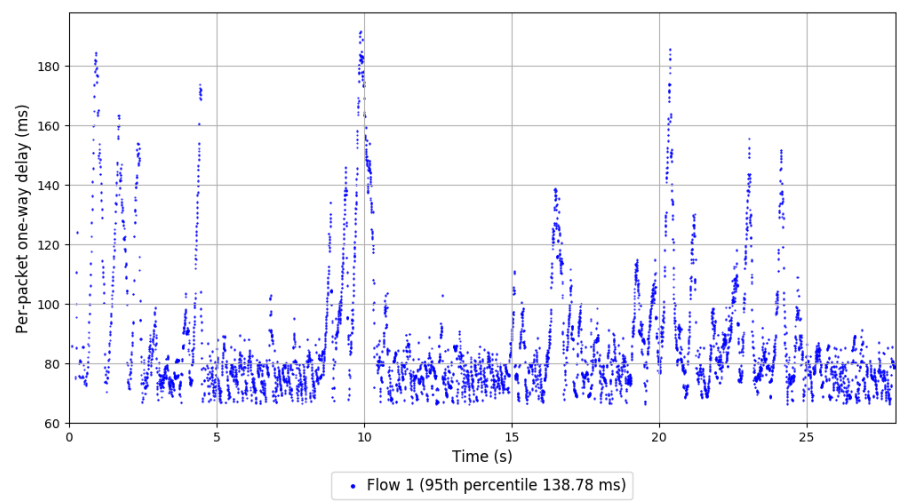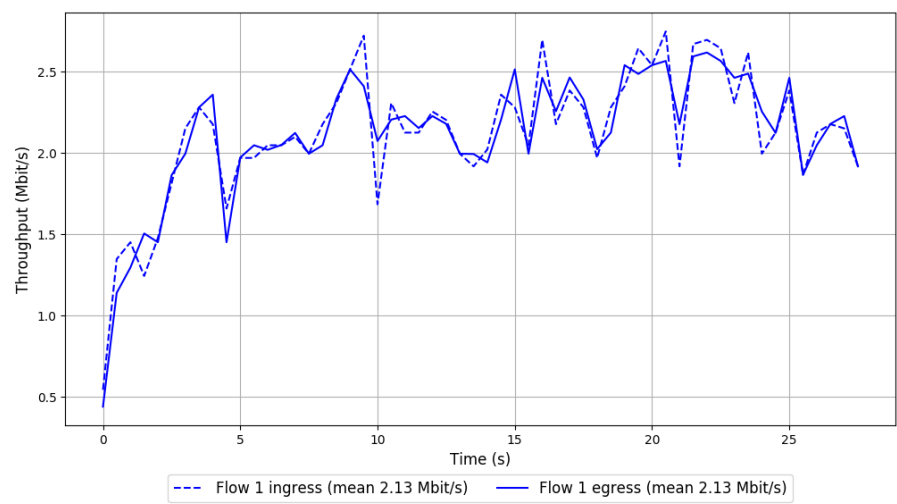Flow 1 (95th percentile 367.05 ms)

```
Run 1: Statistics of Copa

Start at: 2017-11-20 21:55:47
End at: 2017-11-20 21:56:17
Local clock offset: 7.316 ms
Remote clock offset: -12.457 ms


# Below is generated by plot.py at 2017-11-20 23:24:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 138.784 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 138.784 ms
Loss rate: 0.22%
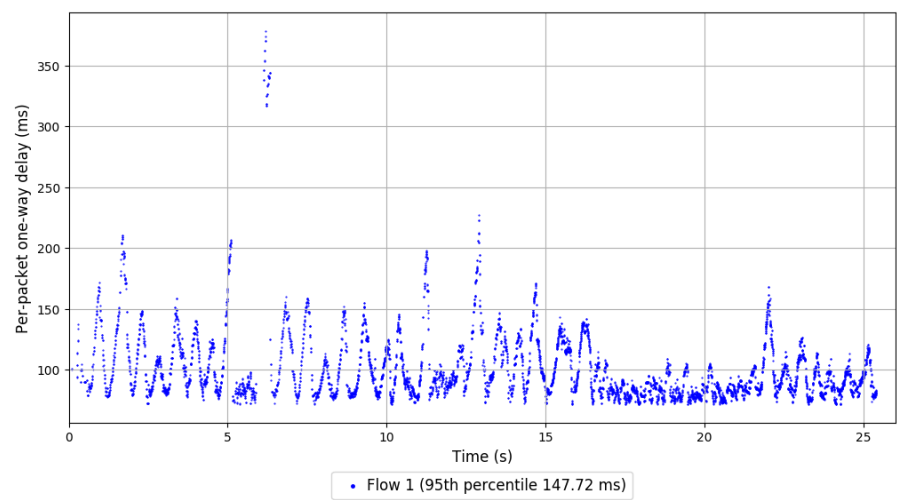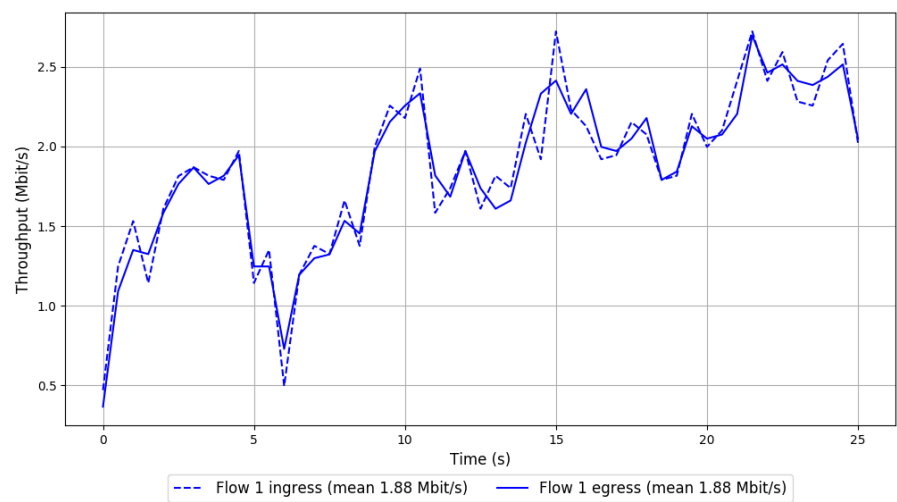```

Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2017-11-20 22:13:33
End at: 2017-11-20 22:14:03
Local clock offset: 10.067 ms
Remote clock offset: -13.765 ms

Below is generated by plot.py at 2017-11-20 23:24:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 147.723 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 147.723 ms
Loss rate: 0.49%
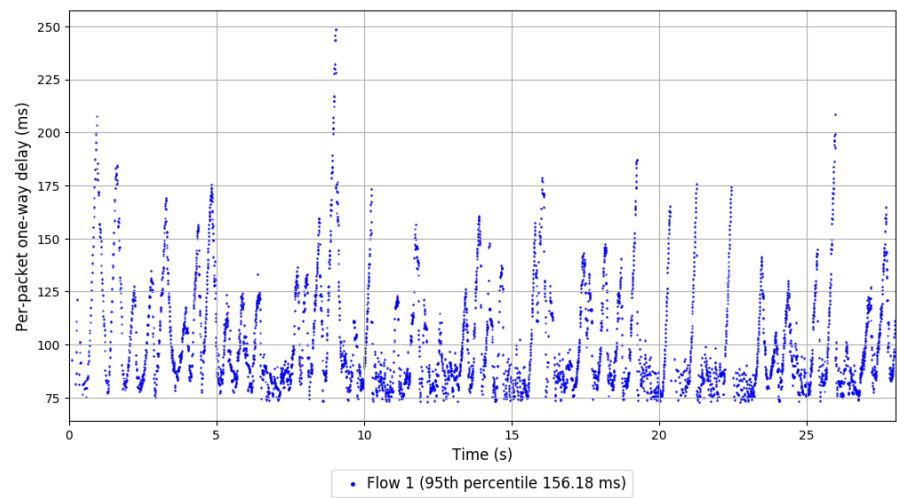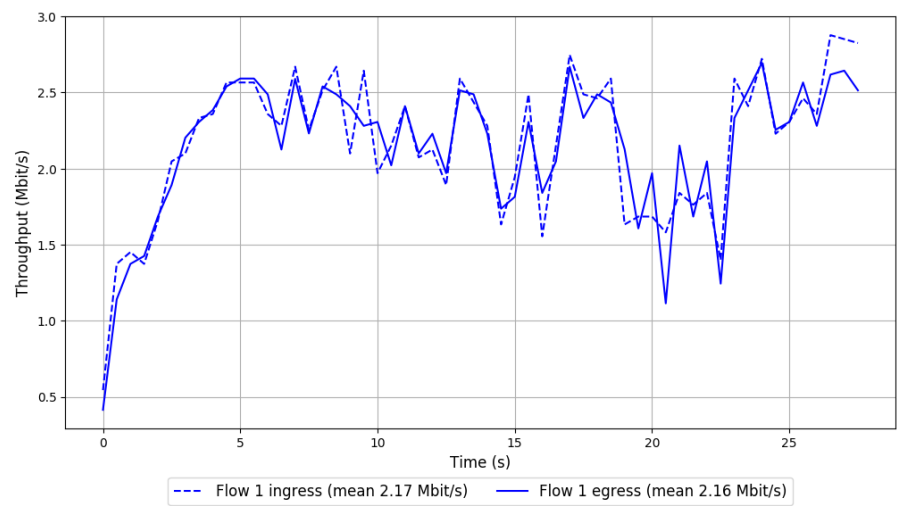```

Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2017-11-20 22:30:17
End at: 2017-11-20 22:30:47
Local clock offset: 9.948 ms
Remote clock offset: -14.426 ms


# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 156.182 ms
Loss rate: 0.96%
-- Flow 1:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 156.182 ms
Loss rate: 0.96%
```

Run 3: Report of Copa — Data Link

Flow 1 ingress (mean 2.17 Mbit/s) —— Flow 1 egress (mean 2.16 Mbit/s)

• Flow 1 (95th percentile 156.18 ms)
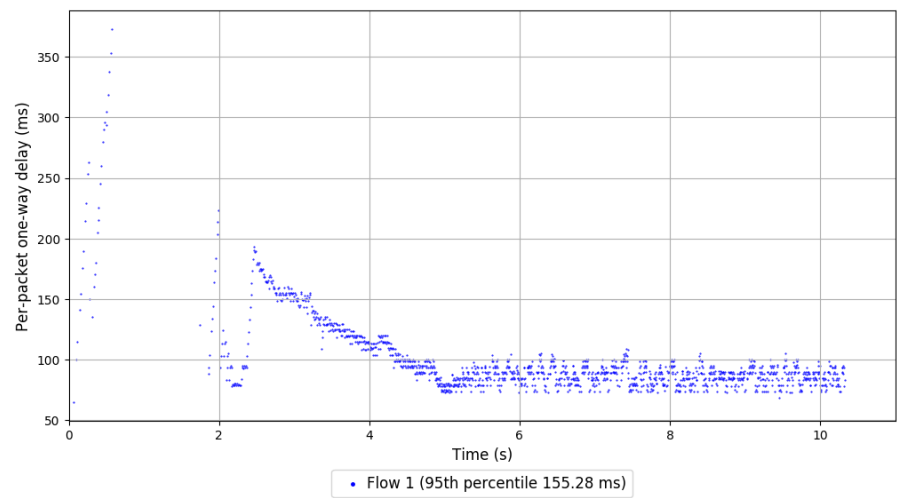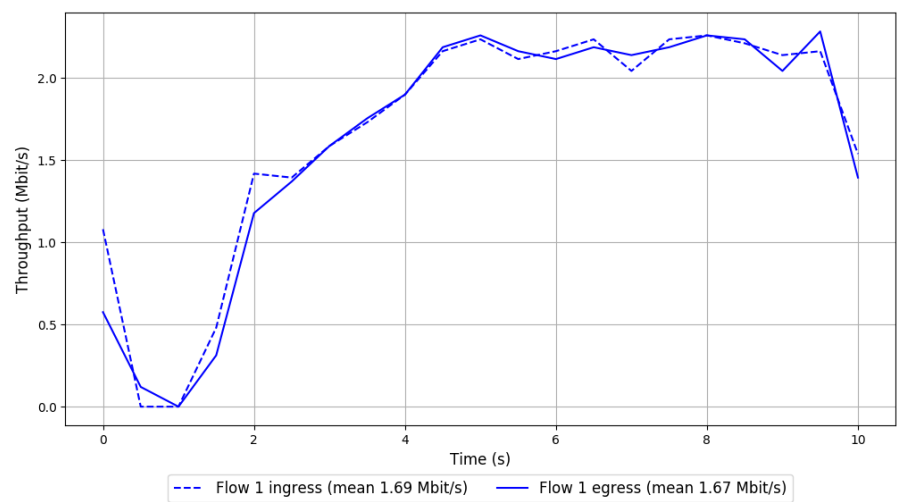
Run 1: Statistics of Indigo

Start at: 2017-11-20 21:53:23
End at: 2017-11-20 21:53:53
Local clock offset: 8.855 ms
Remote clock offset: -11.689 ms
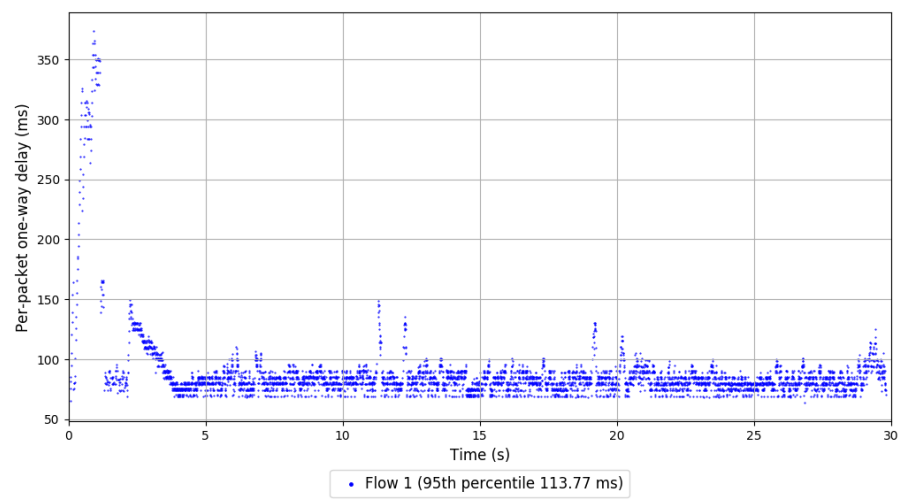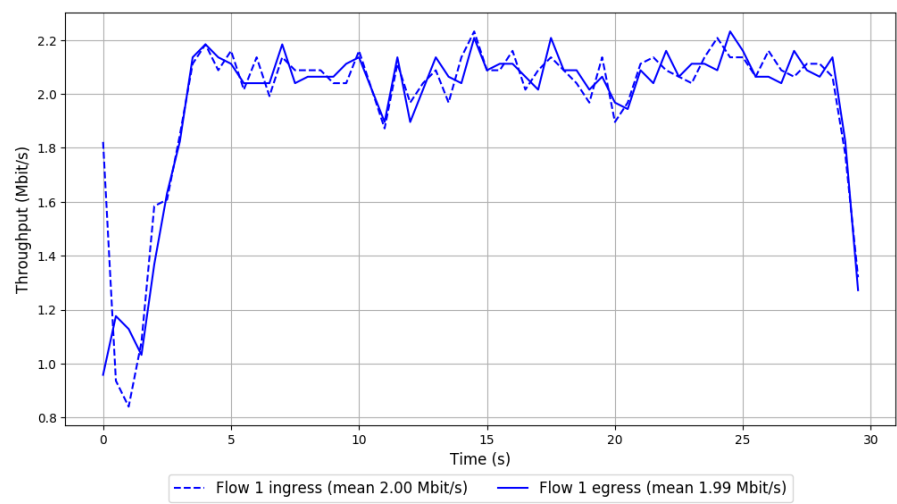
Run 1: Report of Indigo — Data Link

```
Run 2: Statistics of Indigo

Start at: 2017-11-20 22:10:28
End at: 2017-11-20 22:10:58
Local clock offset: 8.218 ms
Remote clock offset: -13.477 ms

# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 113.774 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 113.774 ms
Loss rate: 0.46%
```

Run 2: Report of Indigo — Data Link

Flow 1 ingress (mean 2.00 Mbit/s) --- Flow 1 egress (mean 1.99 Mbit/s)

• Flow 1 (95th percentile 113.77 ms)

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```
Run 3: Statistics of Indigo

Start at: 2017-11-20 22:28:00
End at: 2017-11-20 22:28:30
Local clock offset: 3.588 ms
Remote clock offset: -14.935 ms

# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 101.244 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 101.244 ms
Loss rate: 0.42%
```
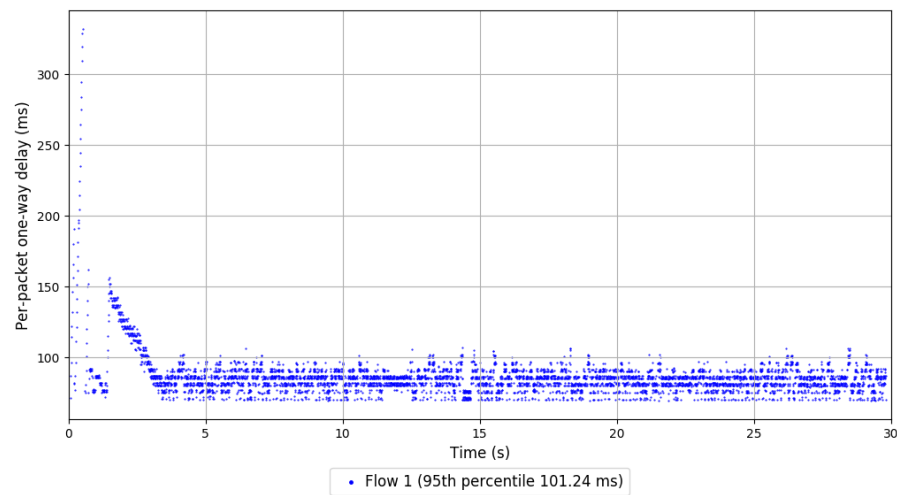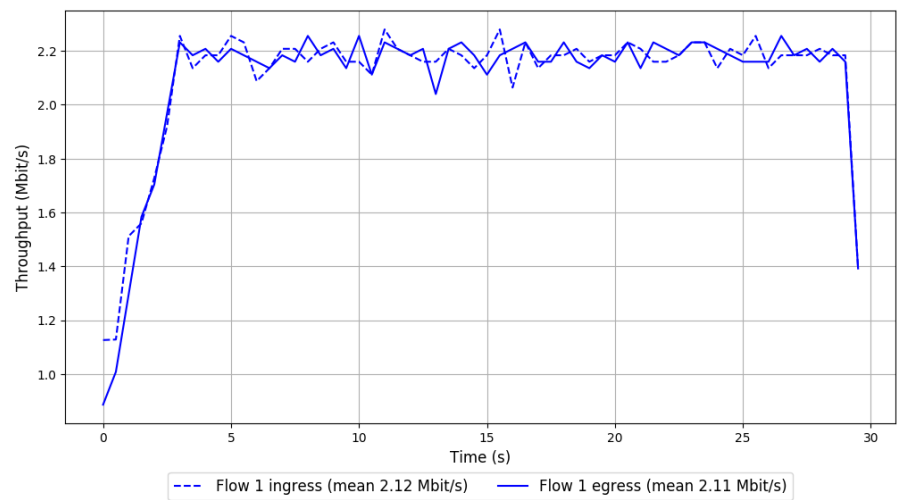
Run 3: Report of Indigo — Data Link

Flow 1 ingress (mean 2.12 Mbit/s) --- Flow 1 egress (mean 2.11 Mbit/s)
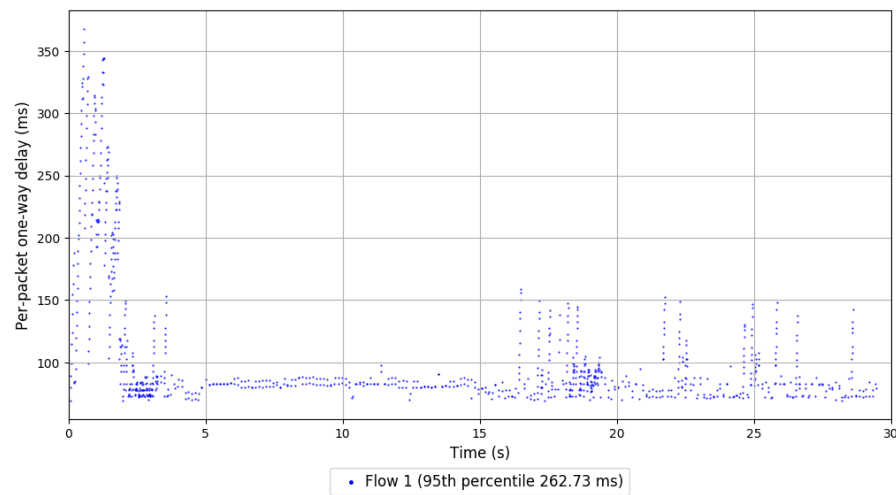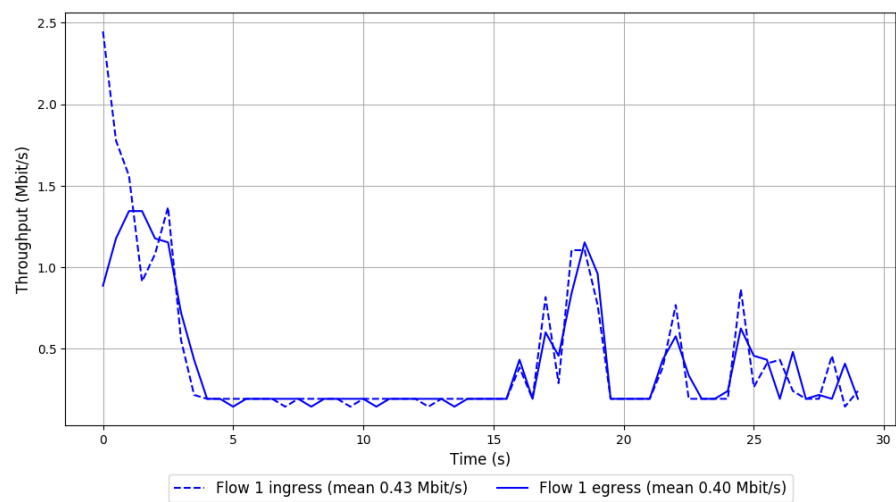

Flow 1 (95th percentile 101.24 ms)

```
Run 1: Statistics of Indigo-calib

Start at: 2017-11-20 21:52:15
End at: 2017-11-20 21:52:45
Local clock offset: 6.98 ms
Remote clock offset: -12.039 ms

# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 262.725 ms
Loss rate: 6.97%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 262.725 ms
Loss rate: 6.97%
```

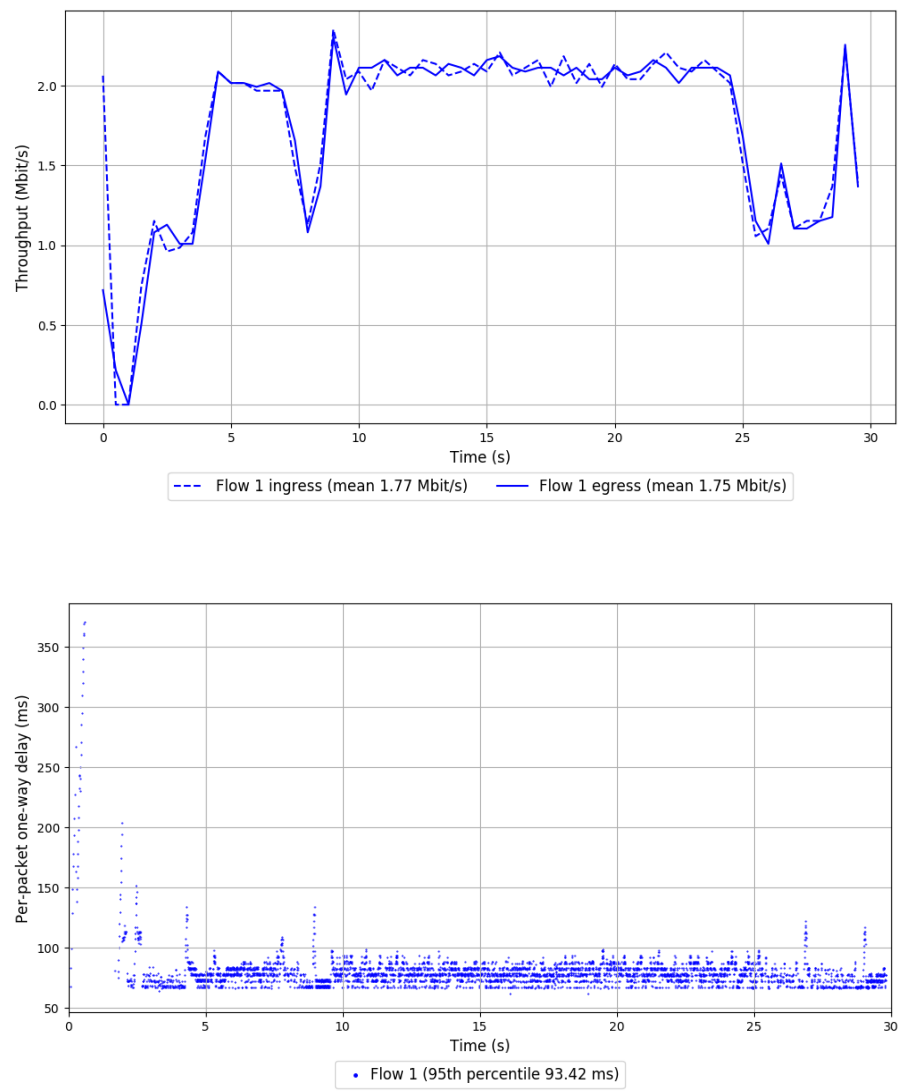# Run 1: Report of Indigo-calib — Data Link

```
Run 2: Statistics of Indigo-calib

Start at: 2017-11-20 22:09:17
End at: 2017-11-20 22:09:47
Local clock offset: 5.593 ms
Remote clock offset: -13.652 ms


# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 93.416 ms
Loss rate: 1.41%
-- Flow 1:
Average throughput: 1.75 Mbit/s
95th percentile per-packet one-way delay: 93.416 ms
Loss rate: 1.41%
```

Run 2: Report of Indigo-calib — Data Link

```
Run 3: Statistics of Indigo-calib

Start at: 2017-11-20 22:26:49
End at: 2017-11-20 22:27:19
Local clock offset: 7.744 ms
Remote clock offset: -15.397 ms

# Below is generated by plot.py at 2017-11-20 23:24:25
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 221.334 ms
Loss rate: 6.73%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 221.334 ms
Loss rate: 6.73%
```

Run 3: Report of Indigo-calib — Data Link

Flow 1 ingress (mean 0.76 Mbit/s) ---- Flow 1 egress (mean 0.70 Mbit/s) ——

Flow 1 (95th percentile 221.33 ms)