Pantheon Report

Generated at 2018-01-26 00:19:34 (UTC).

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

Repeated the test of 15 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

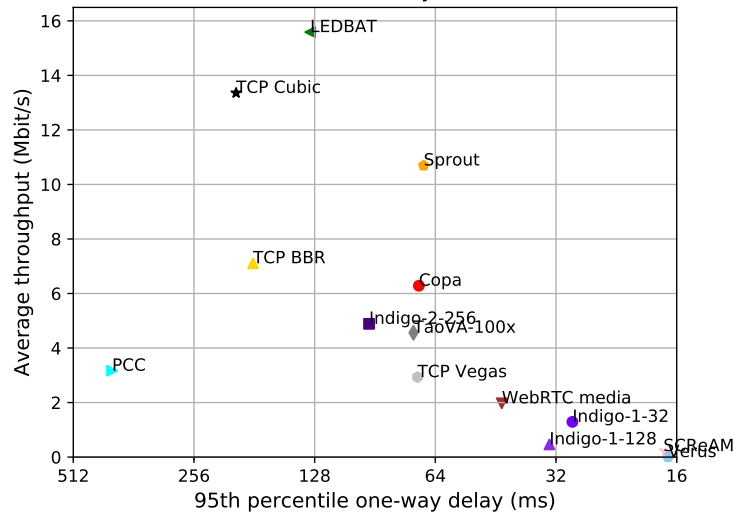Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

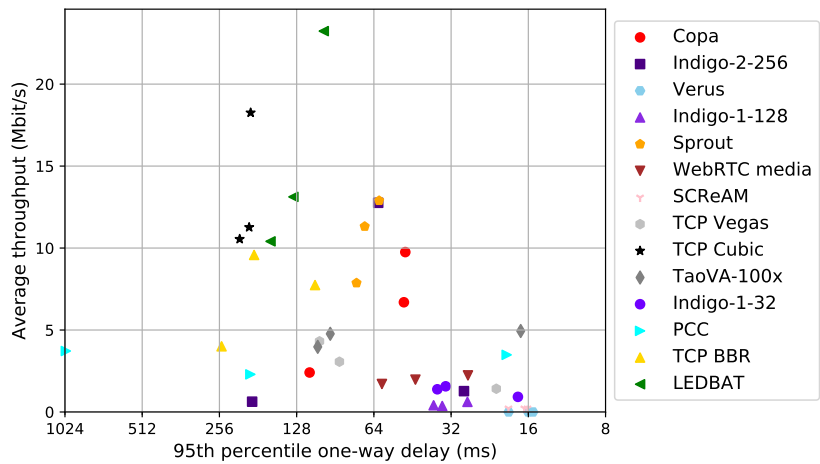NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

```
Git summary:
branch: master @ f23294ec38436c9f802847d477a41b7343ec76e6
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
 M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
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/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
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

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	7.11	182.38	0.22
TCP Cubic	3	13.36	200.99	0.28
LEDBAT	3	15.59	131.35	0.19
PCC	3	3.17	409.78	4.20
QUIC Cubic	0	N/A	N/A	N/A
SCReAM	3	0.22	17.28	0.00
WebRTC media	3	1.97	43.71	0.03
Sprout	3	10.69	68.45	0.04
TaoVA-100x	3	4.56	72.57	0.01
TCP Vegas	3	2.93	70.92	0.00
Verus	3	0.00	16.82	0.00
Copa	3	6.28	70.37	0.01
Indigo-2-256	3	4.89	93.65	0.04
Indigo-1-32	3	1.29	29.13	0.00
Indigo-1-128	3	0.47	33.24	0.00

```
Run 1: Statistics of TCP BBR

Start at: 2018-01-25 22:41:02
End at: 2018-01-25 22:41:32
Local clock offset: -2.716 ms

# Below is generated by plot.py at 2018-01-26 00:18:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 251.127 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 251.127 ms
Loss rate: 0.26%
```
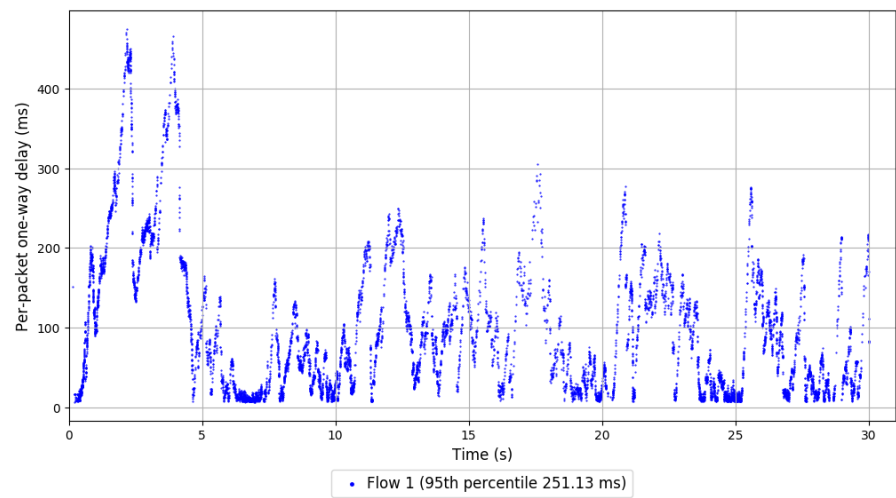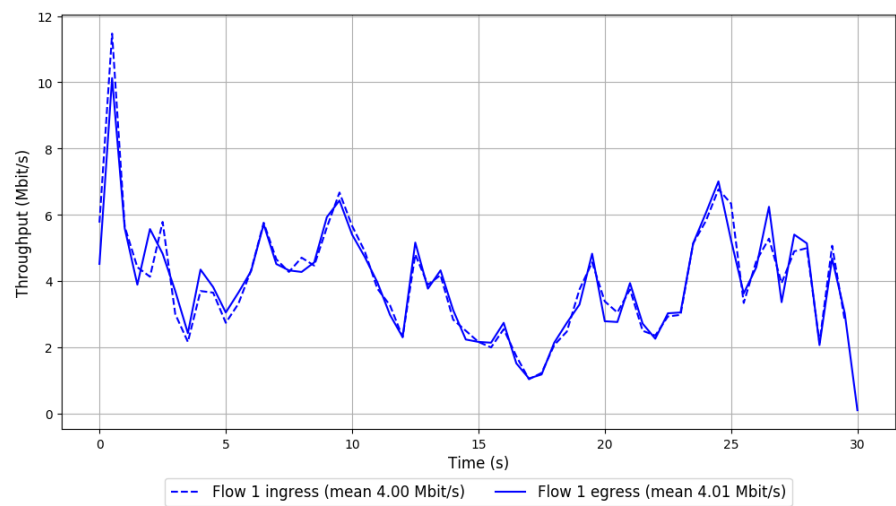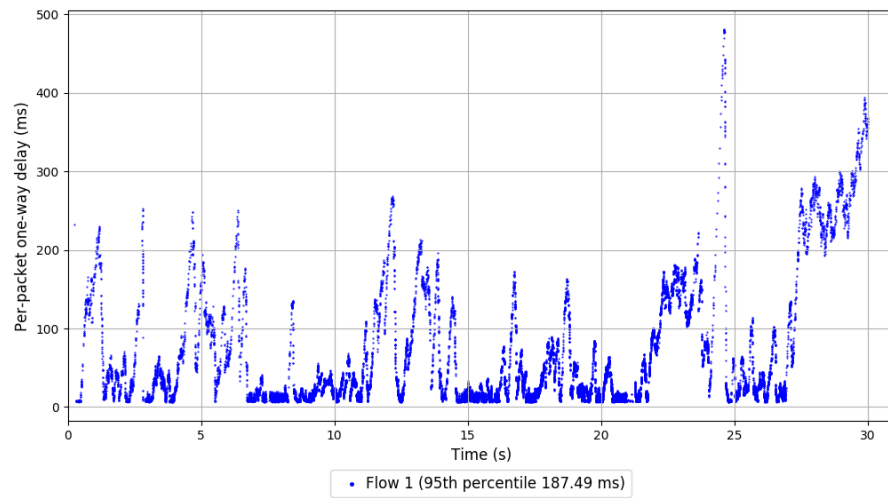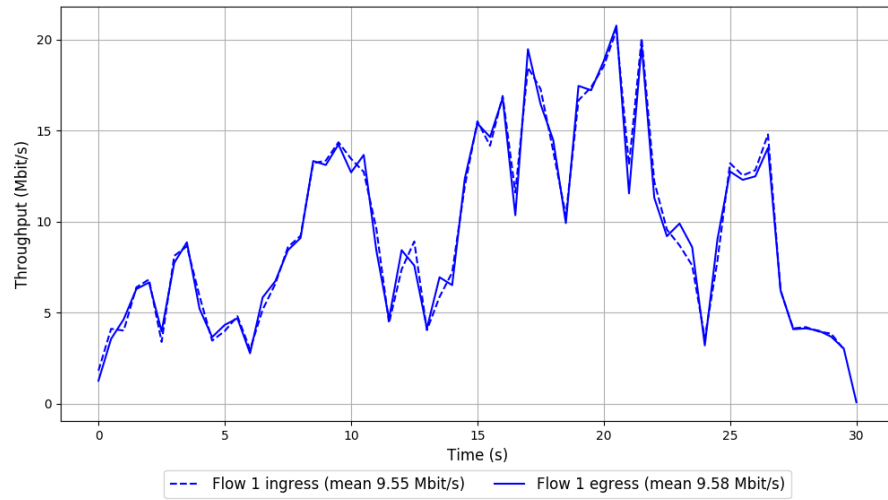
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-01-25 23:27:46
End at: 2018-01-25 23:28:16
Local clock offset: -3.241 ms

# Below is generated by plot.py at 2018-01-26 00:18:51
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.58 Mbit/s
95th percentile per-packet one-way delay: 187.493 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 9.58 Mbit/s
95th percentile per-packet one-way delay: 187.493 ms
Loss rate: 0.39%
```
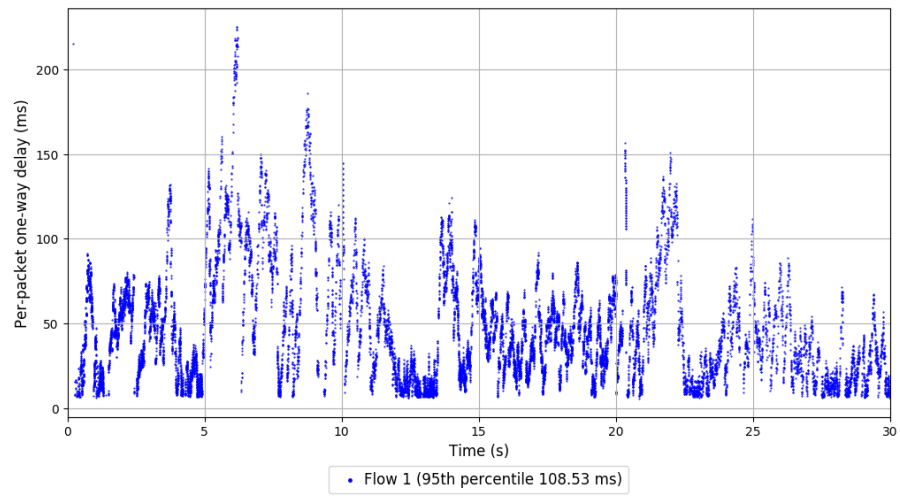
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-01-26 00:14:28
End at: 2018-01-26 00:14:58
Local clock offset: -3.466 ms

# Below is generated by plot.py at 2018-01-26 00:18:51
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.74 Mbit/s
95th percentile per-packet one-way delay: 108.527 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 7.74 Mbit/s
95th percentile per-packet one-way delay: 108.527 ms
Loss rate: 0.01%
```
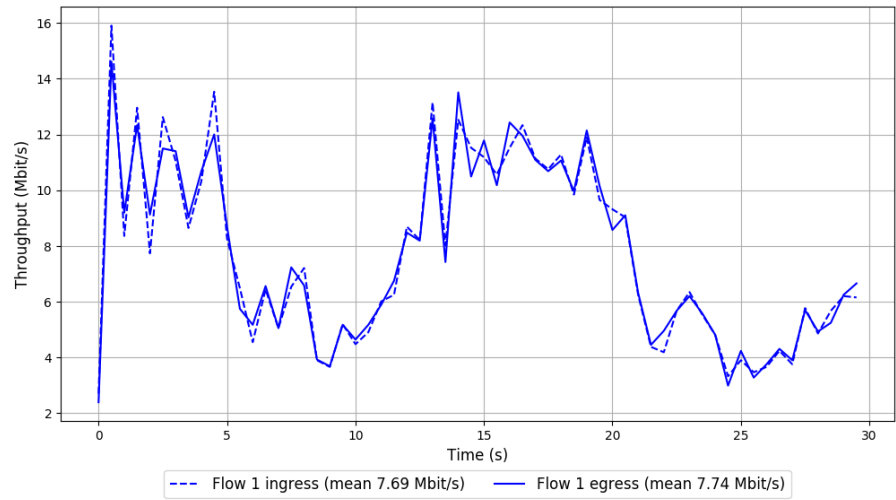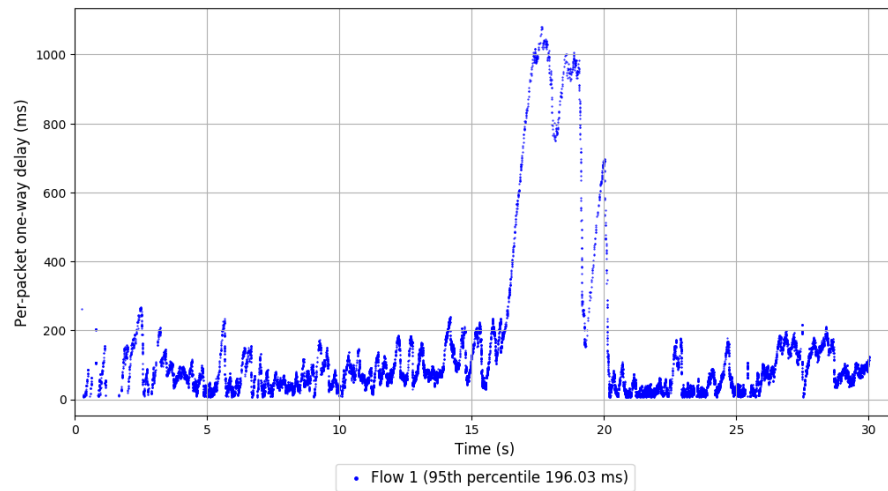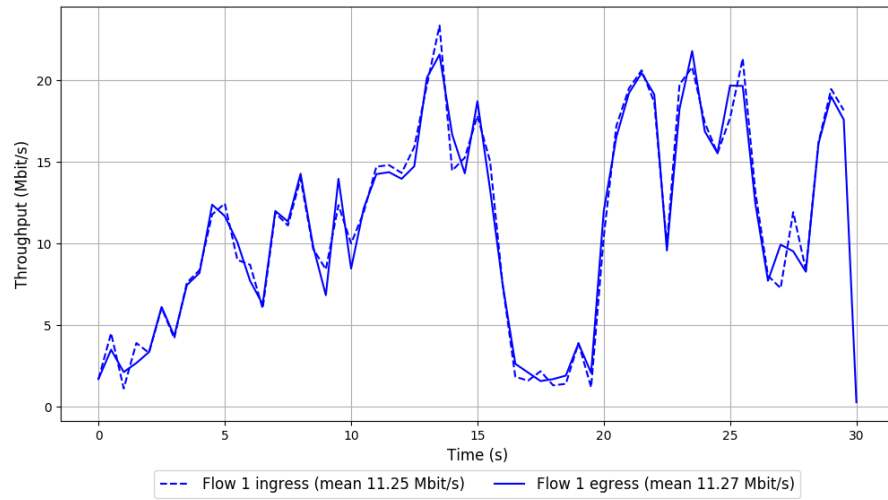
Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 7.69 Mbit/s)   Flow 1 egress (mean 7.74 Mbit/s)

Flow 1 (95th percentile 108.53 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-01-25 22:35:11
End at: 2018-01-25 22:35:41
Local clock offset: -3.022 ms

# Below is generated by plot.py at 2018-01-26 00:18:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.27 Mbit/s
95th percentile per-packet one-way delay: 196.029 ms
Loss rate: 0.63%
-- Flow 1:
Average throughput: 11.27 Mbit/s
95th percentile per-packet one-way delay: 196.029 ms
Loss rate: 0.63%
```
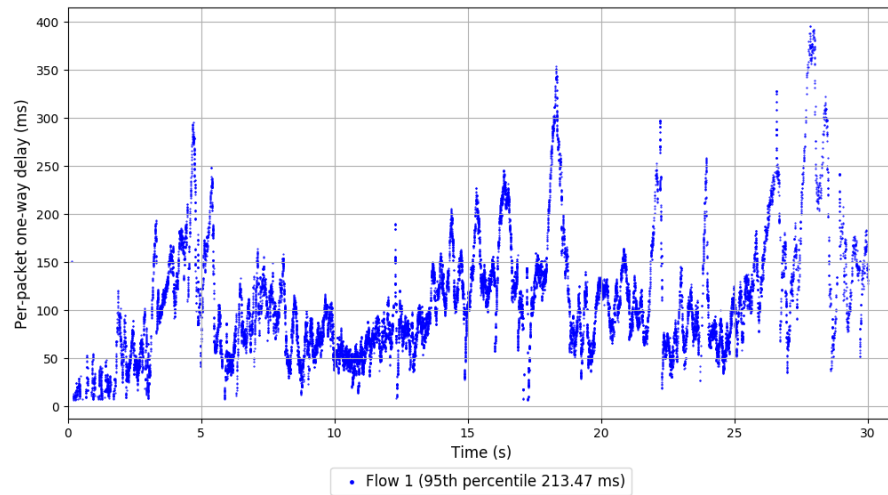
Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2018-01-25 23:21:55
End at: 2018-01-25 23:22:25
Local clock offset: -3.131 ms


# Below is generated by plot.py at 2018-01-26 00:18:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.55 Mbit/s
95th percentile per-packet one-way delay: 213.471 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 10.55 Mbit/s
95th percentile per-packet one-way delay: 213.471 ms
Loss rate: 0.19%
```
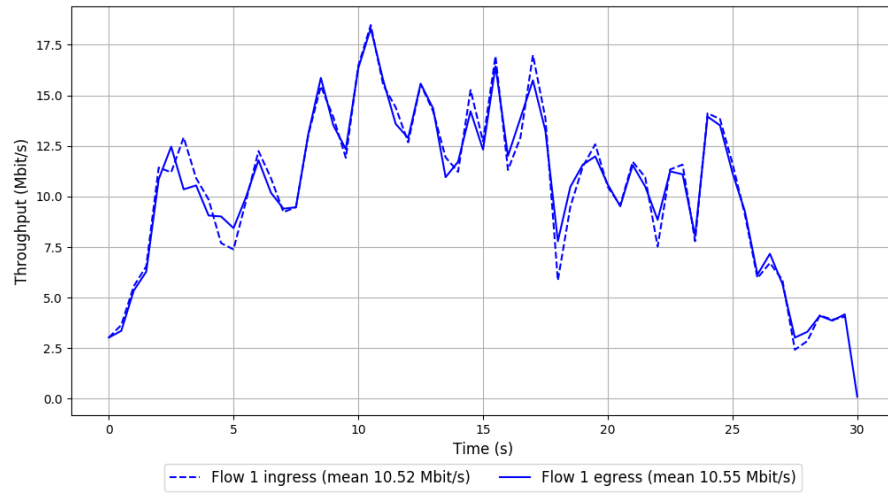
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2018-01-26 00:08:38
End at: 2018-01-26 00:09:08
Local clock offset: -3.432 ms

# Below is generated by plot.py at 2018-01-26 00:19:06
# Datalink statistics
-- Total of 1 flow:
Average throughput: 18.26 Mbit/s
95th percentile per-packet one-way delay: 193.455 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 18.26 Mbit/s
95th percentile per-packet one-way delay: 193.455 ms
Loss rate: 0.02%
```
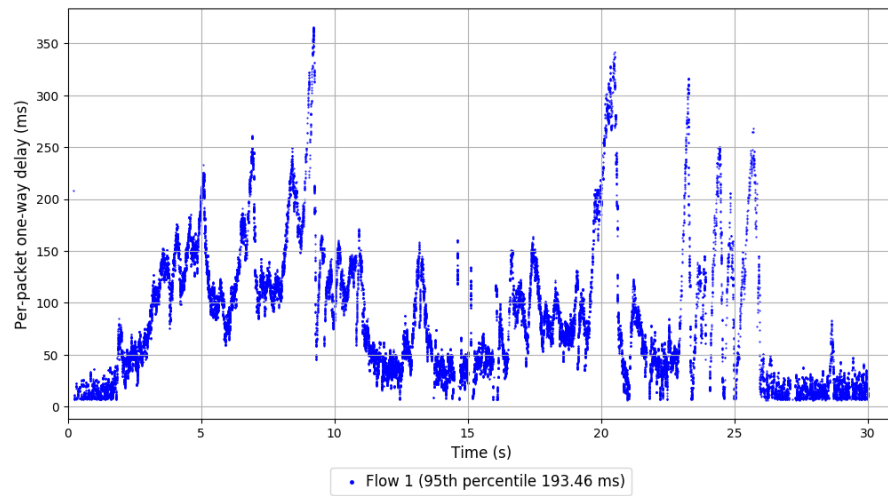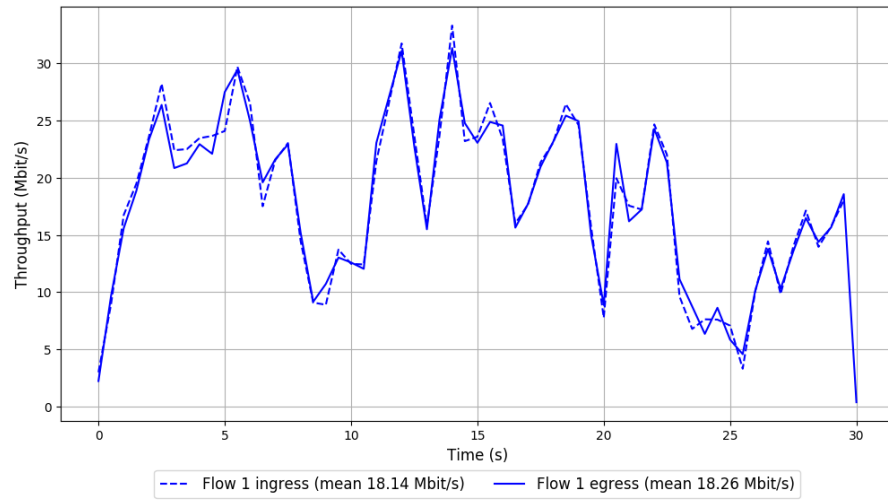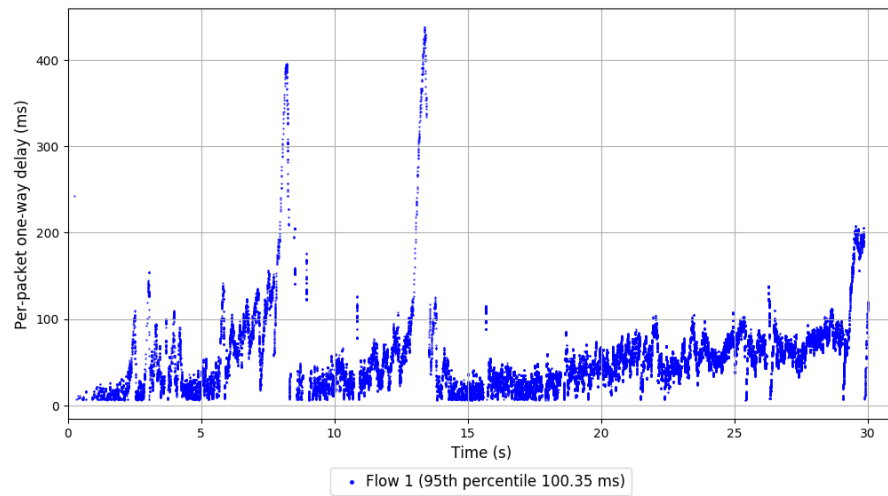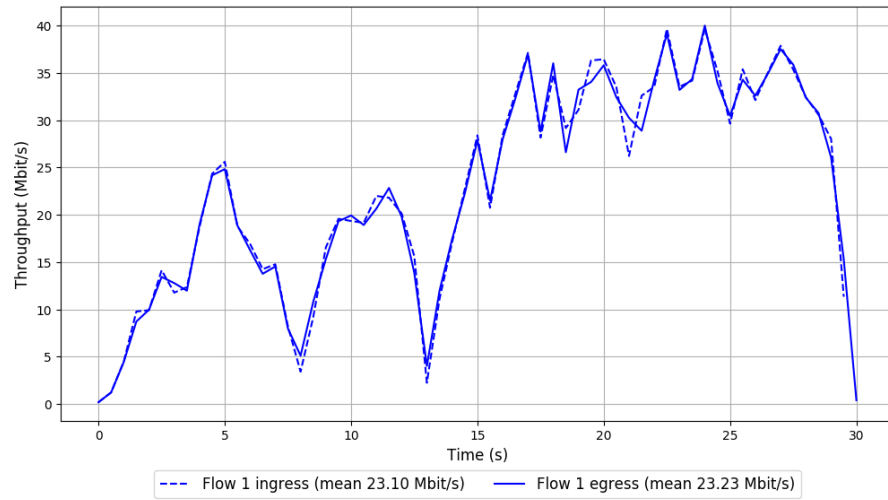
Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 18.14 Mbit/s) —— Flow 1 egress (mean 18.26 Mbit/s)

• Flow 1 (95th percentile 193.46 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2018-01-25 22:17:39
End at: 2018-01-25 22:18:09
Local clock offset: -3.562 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 23.23 Mbit/s
95th percentile per-packet one-way delay: 100.353 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 23.23 Mbit/s
95th percentile per-packet one-way delay: 100.353 ms
Loss rate: 0.16%
```
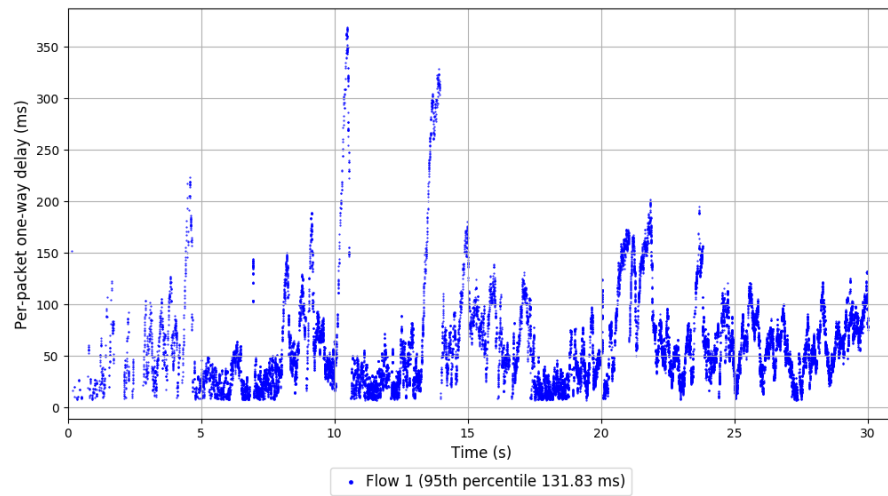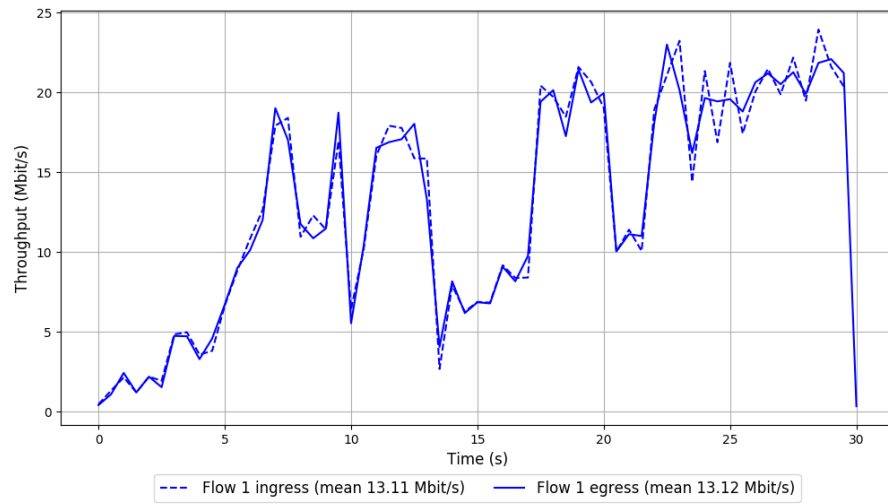
Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 23.10 Mbit/s) --- Flow 1 egress (mean 23.23 Mbit/s)

Flow 1 (95th percentile 100.35 ms)

```
Run 2: Statistics of LEDBAT

Start at: 2018-01-25 23:04:23
End at: 2018-01-25 23:04:53
Local clock offset: -2.17 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.12 Mbit/s
95th percentile per-packet one-way delay: 131.827 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 13.12 Mbit/s
95th percentile per-packet one-way delay: 131.827 ms
Loss rate: 0.27%
```
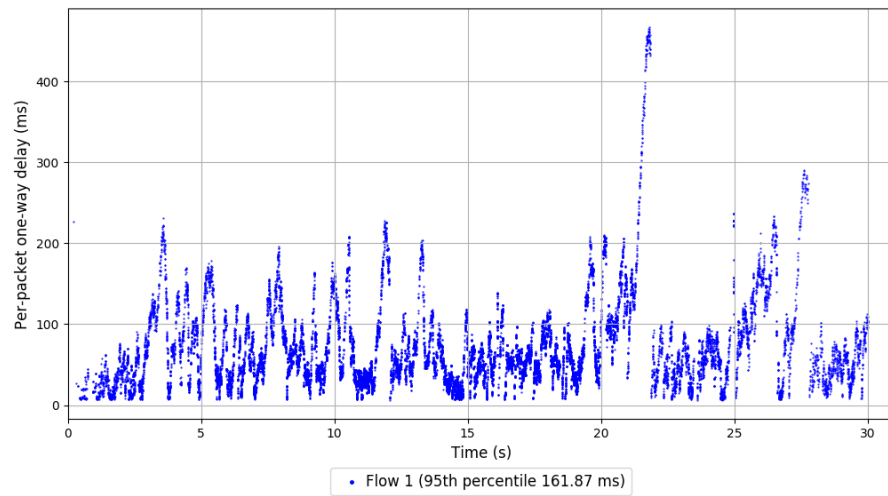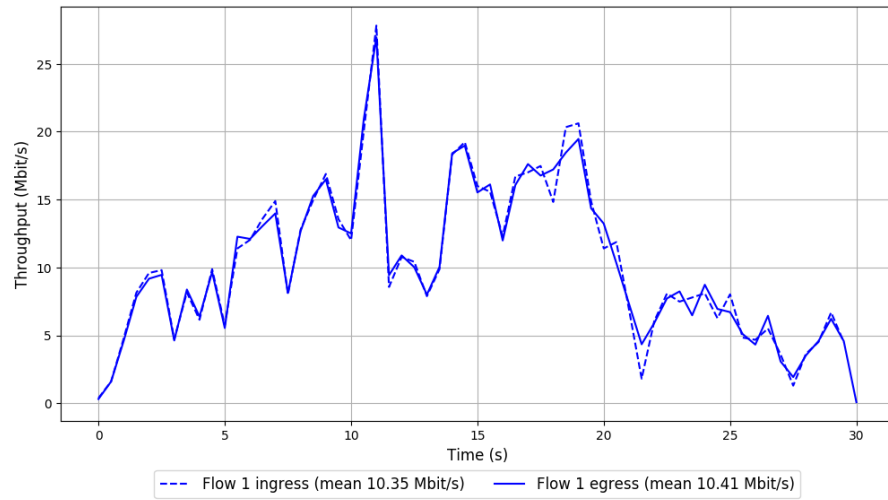
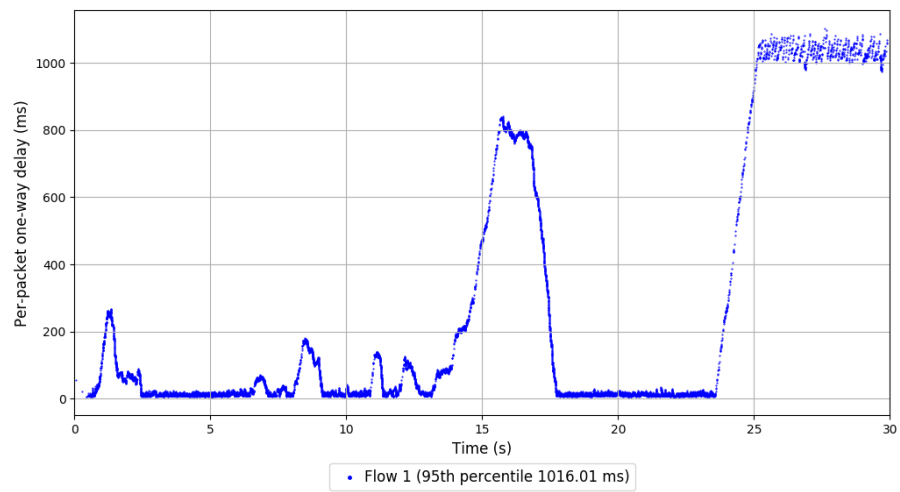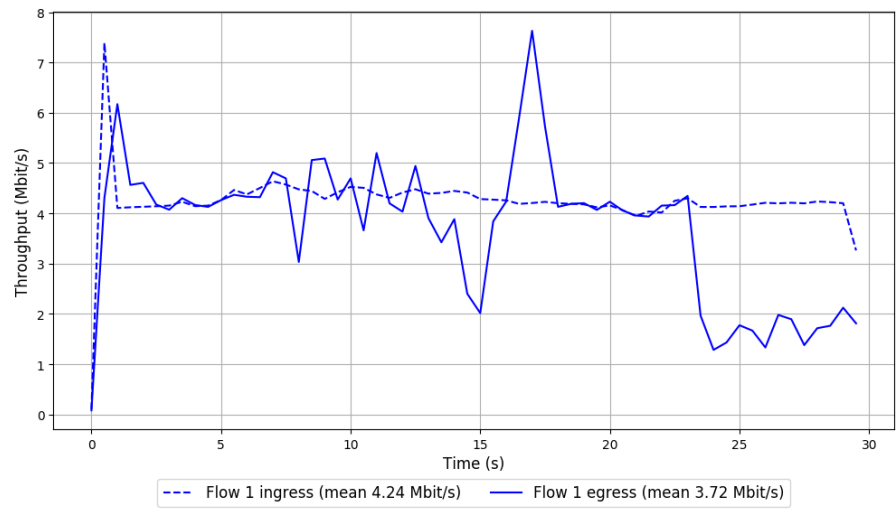Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 13.11 Mbit/s) --- Flow 1 egress (mean 13.12 Mbit/s)

Flow 1 (95th percentile 131.83 ms)

```
Run 3: Statistics of LEDBAT

Start at: 2018-01-25 23:51:07
End at: 2018-01-25 23:51:37
Local clock offset: -3.398 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.41 Mbit/s
95th percentile per-packet one-way delay: 161.865 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 10.41 Mbit/s
95th percentile per-packet one-way delay: 161.865 ms
Loss rate: 0.13%
```

Run 3: Report of LEDBAT — Data Link

```
Run 1: Statistics of PCC

Start at: 2018-01-25 22:29:21
End at: 2018-01-25 22:29:51
Local clock offset: -3.394 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 1016.013 ms
Loss rate: 12.47%
-- Flow 1:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 1016.013 ms
Loss rate: 12.47%
```
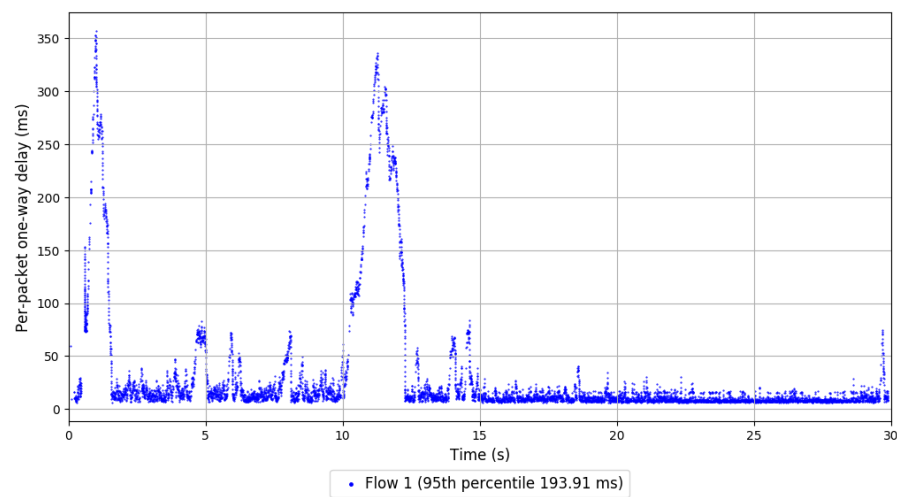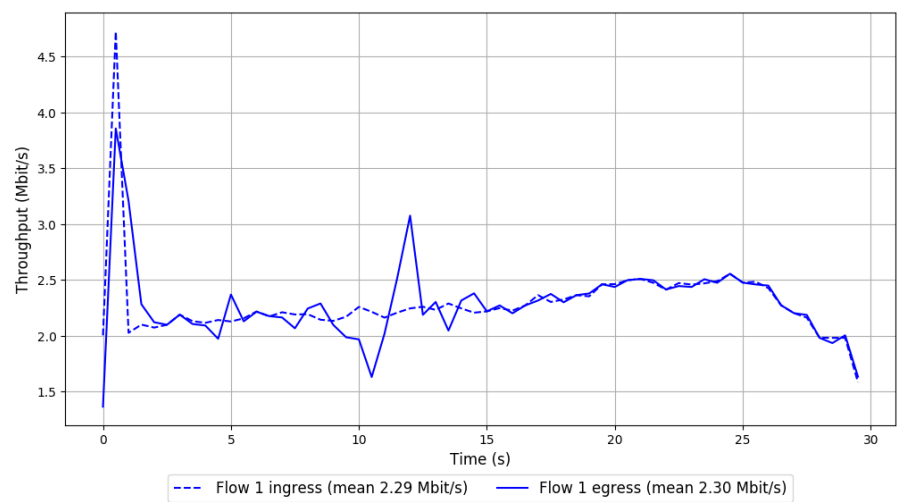
Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 4.24 Mbit/s) --- Flow 1 egress (mean 3.72 Mbit/s)

Flow 1 (95th percentile 1016.01 ms)

```
Run 2: Statistics of PCC

Start at: 2018-01-25 23:16:04
End at: 2018-01-25 23:16:34
Local clock offset: -2.964 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 193.907 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 193.907 ms
Loss rate: 0.09%
```
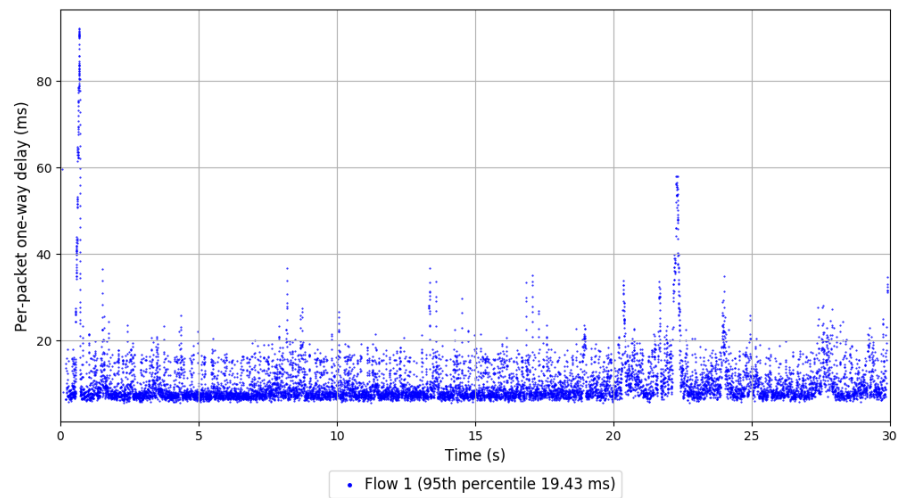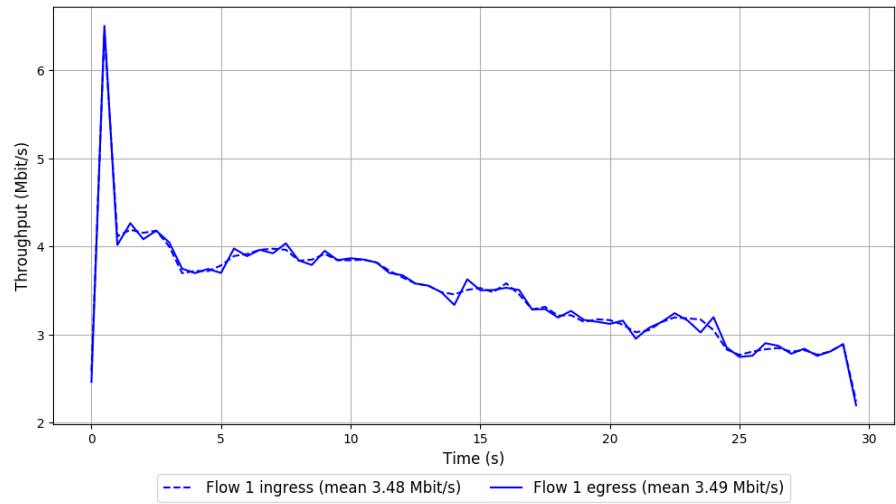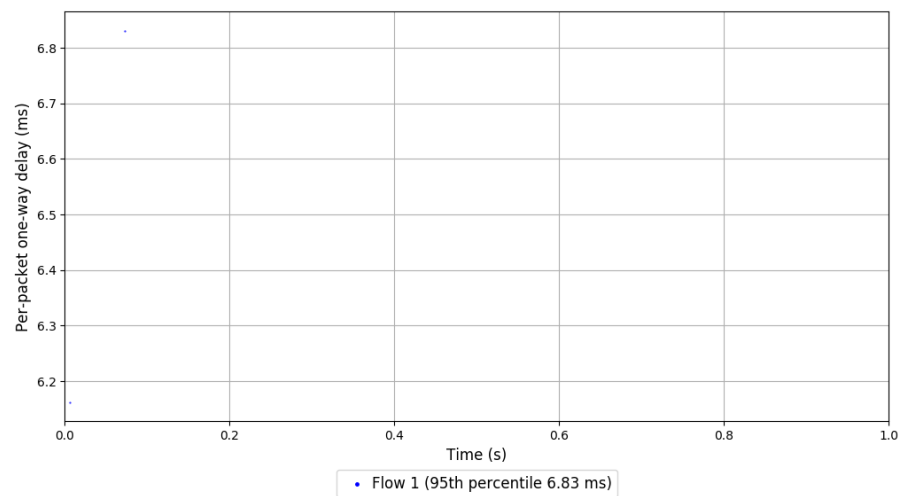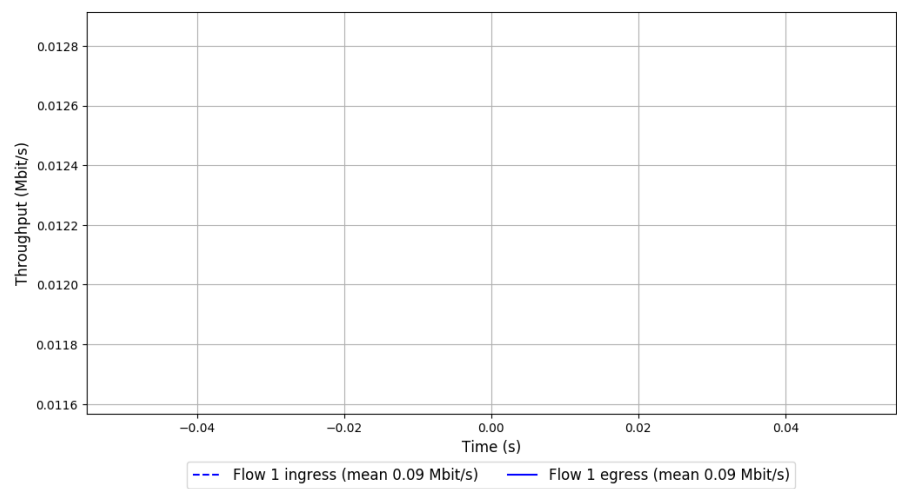
Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 2.29 Mbit/s) Flow 1 egress (mean 2.30 Mbit/s)

Flow 1 (95th percentile 193.91 ms)

```
Run 3: Statistics of PCC

Start at: 2018-01-26 00:02:47
End at: 2018-01-26 00:03:17
Local clock offset: -3.496 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.49 Mbit/s
95th percentile per-packet one-way delay: 19.432 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 3.49 Mbit/s
95th percentile per-packet one-way delay: 19.432 ms
Loss rate: 0.05%
```

Run 3: Report of PCC — Data Link

Run 1: Statistics of QUIC Cubic

Start at: 2018-01-25 22:23:31
End at: 2018-01-25 22:24:01
Local clock offset: -3.425 ms

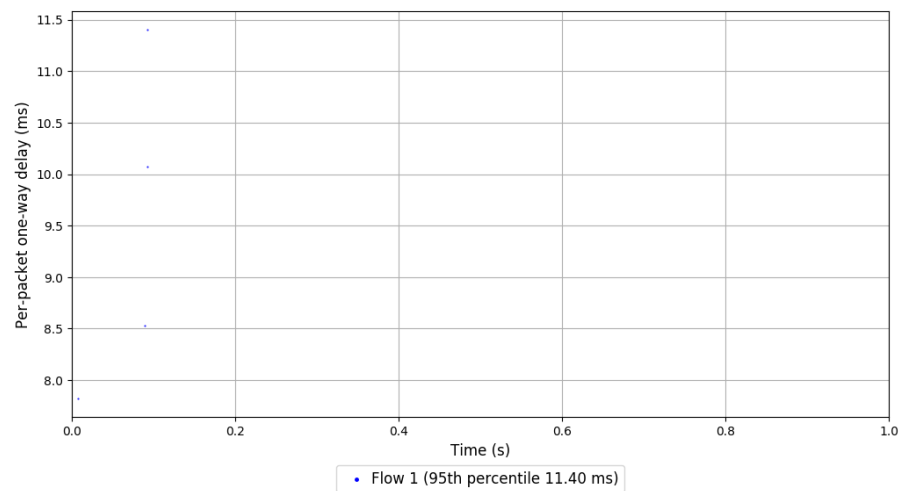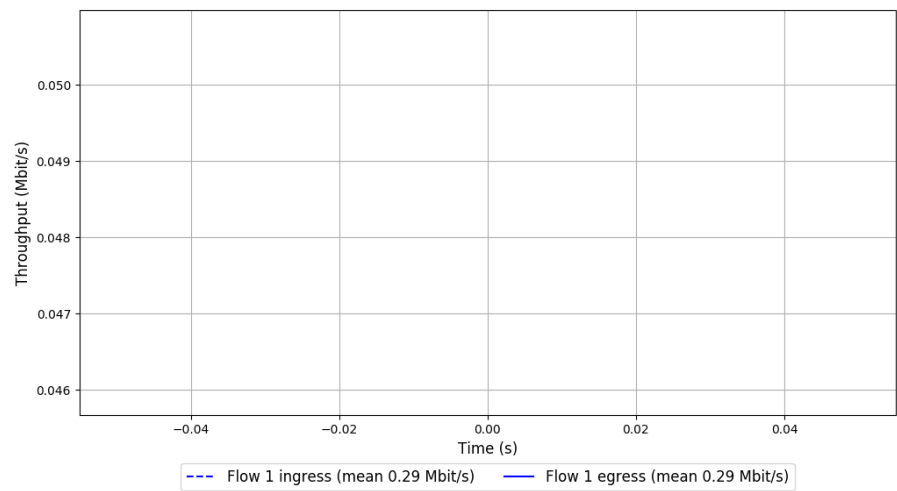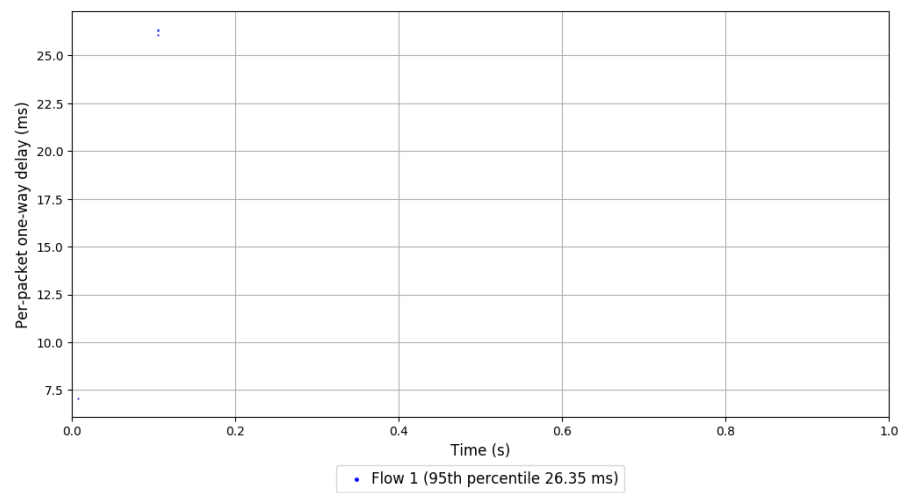Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.09 Mbit/s)   Flow 1 egress (mean 0.09 Mbit/s)

Flow 1 (95th percentile 6.83 ms)

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-01-25 23:10:13
End at: 2018-01-25 23:10:43
Local clock offset: -2.726 ms
```
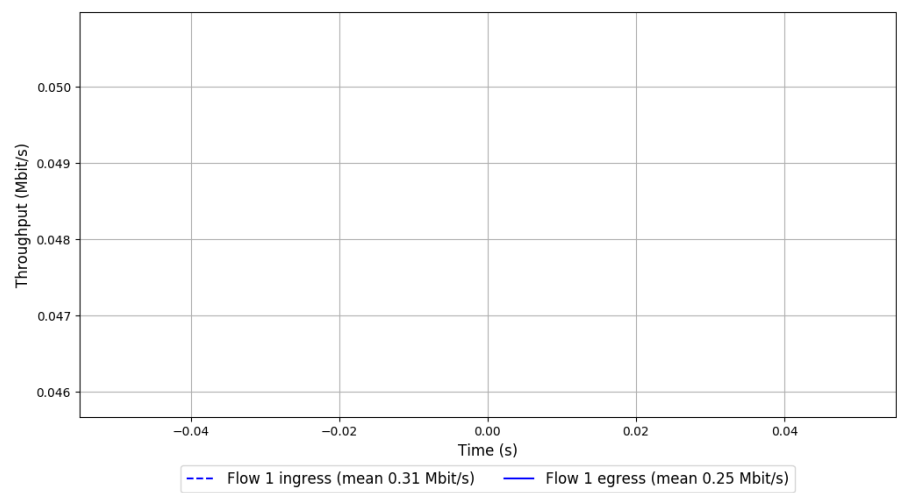
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.29 Mbit/s) --- Flow 1 egress (mean 0.29 Mbit/s)

Flow 1 (95th percentile 11.40 ms)

Run 3: Statistics of QUIC Cubic

Start at: 2018-01-25 23:56:57
End at: 2018-01-25 23:57:27
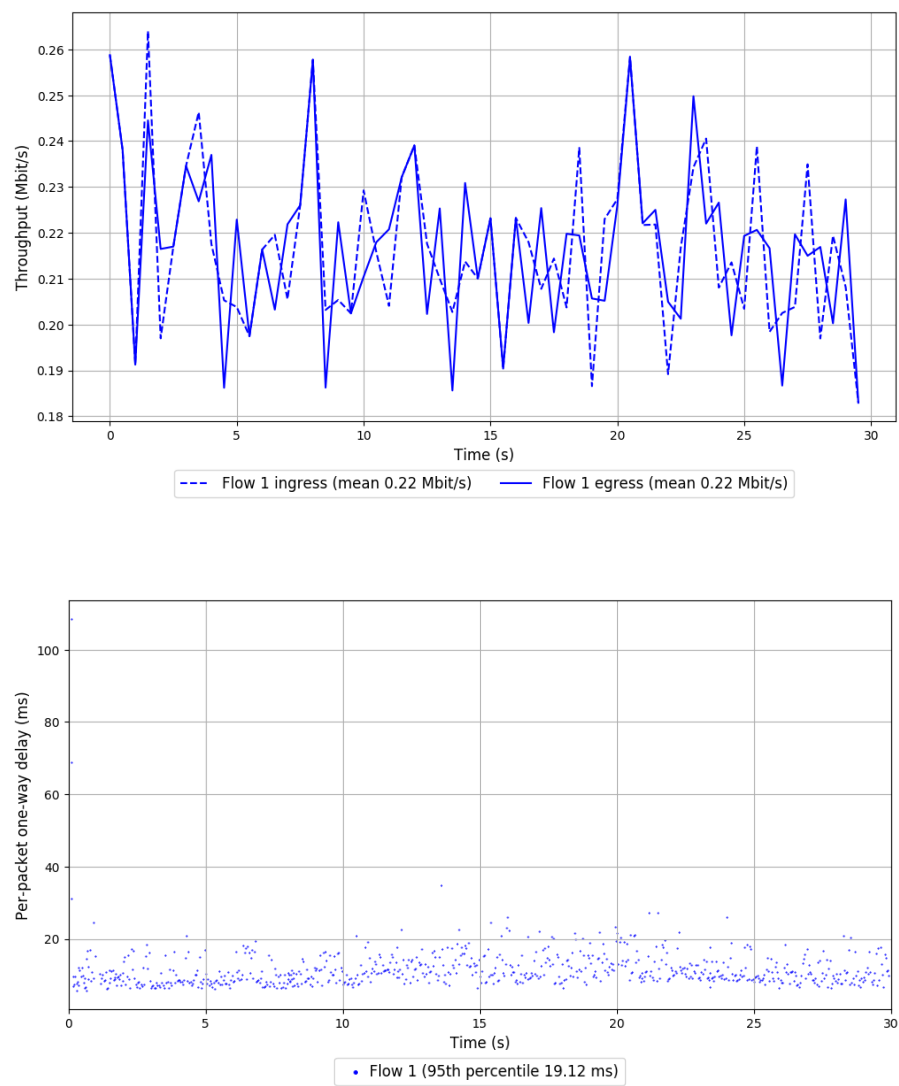Local clock offset: -3.401 ms

Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.31 Mbit/s) ——— Flow 1 egress (mean 0.25 Mbit/s)

• Flow 1 (95th percentile 26.35 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-01-25 22:00:08
End at: 2018-01-25 22:00:38
Local clock offset: -3.577 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.122 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 19.122 ms
Loss rate: 0.00%
```
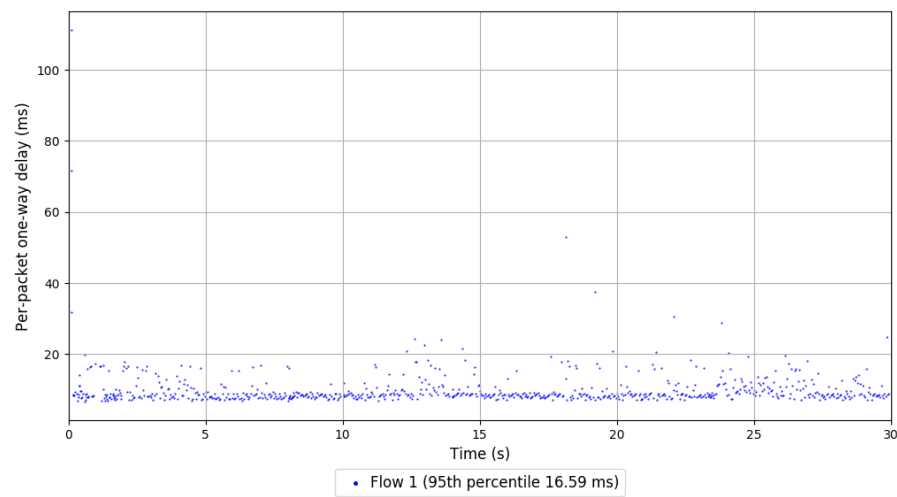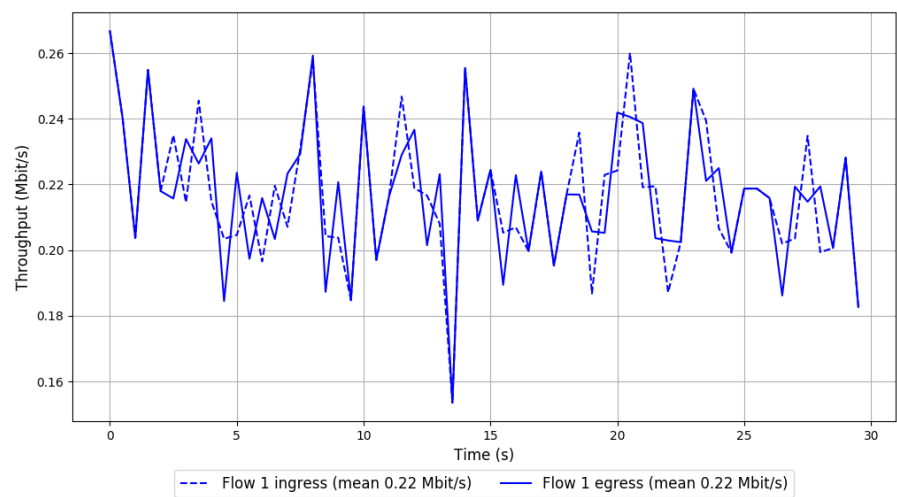
Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-01-25 22:46:53
End at: 2018-01-25 22:47:23
Local clock offset: -2.675 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 16.586 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 16.586 ms
Loss rate: 0.00%
```
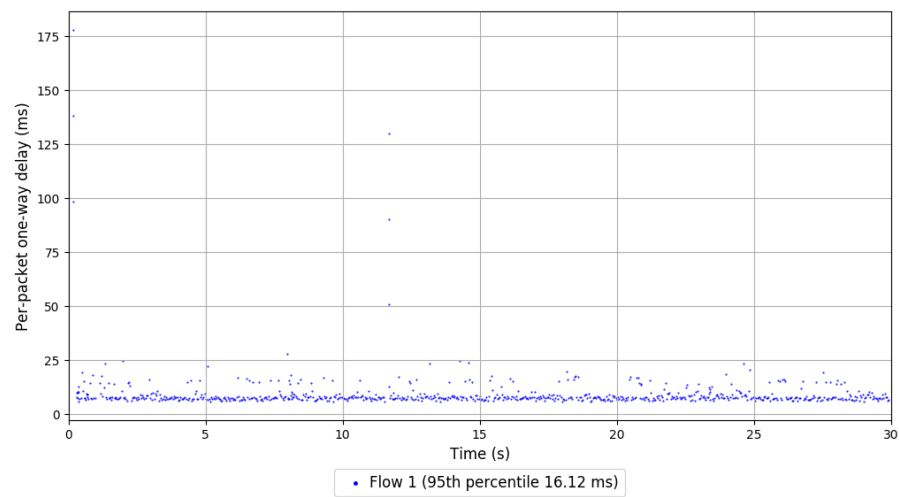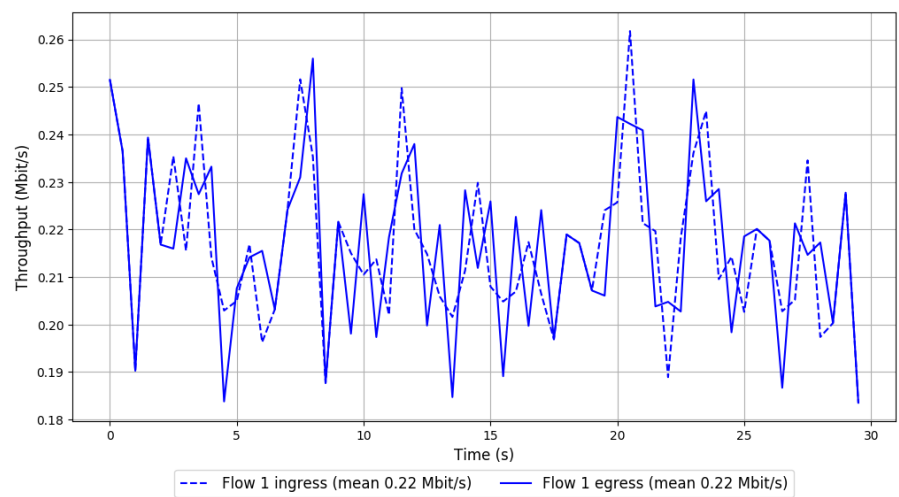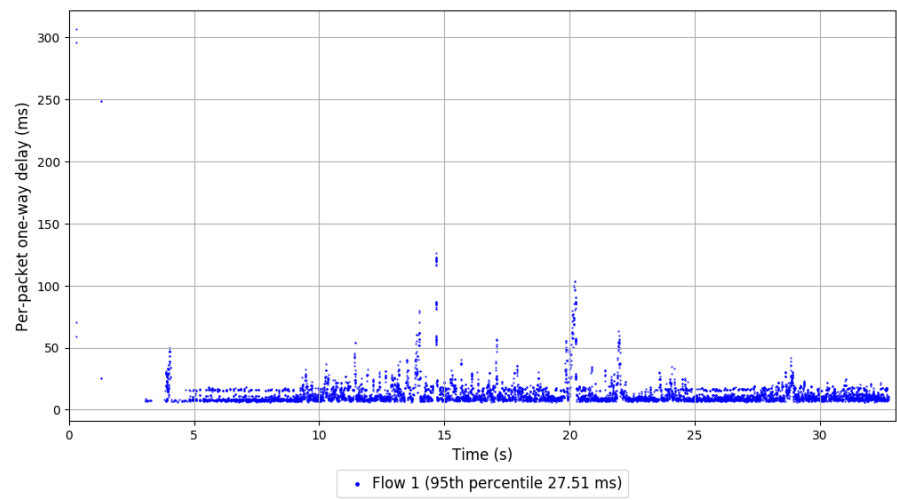
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-01-25 23:33:36
End at: 2018-01-25 23:34:06
Local clock offset: -3.257 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 16.119 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 16.119 ms
Loss rate: 0.00%
```

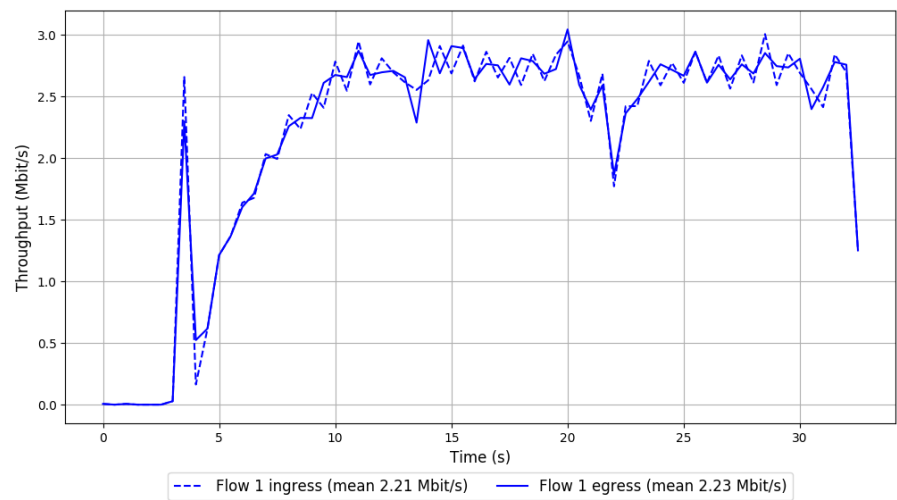Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-01-25 22:38:07
End at: 2018-01-25 22:38:37
Local clock offset: -2.95 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 27.507 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 27.507 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-01-25 23:24:50
End at: 2018-01-25 23:25:20
Local clock offset: -3.252 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 44.078 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 44.078 ms
Loss rate: 0.00%
```
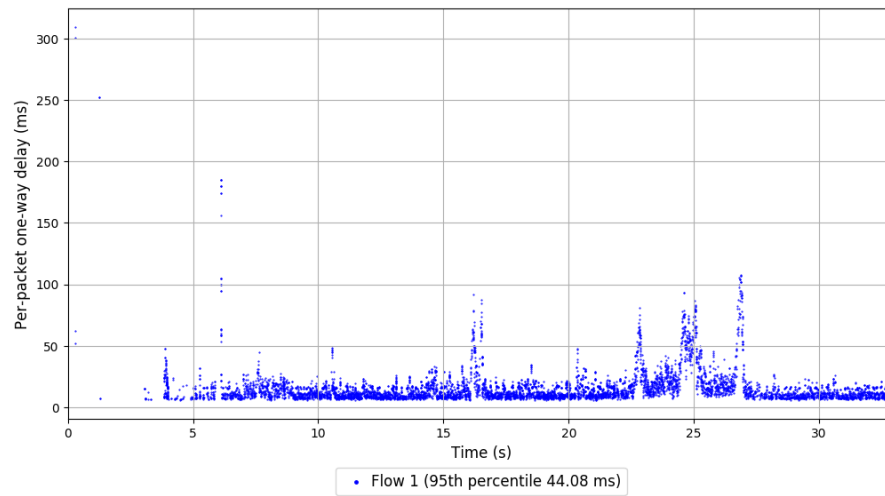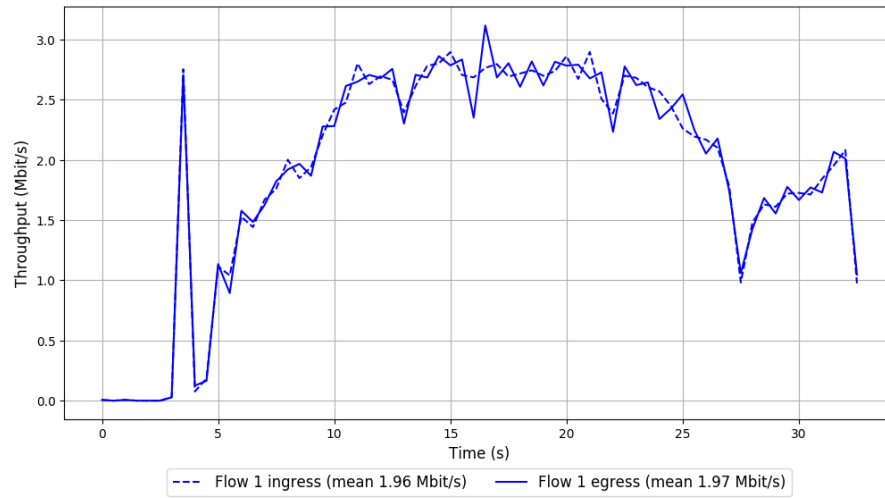
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-01-26 00:11:33
End at: 2018-01-26 00:12:03
Local clock offset: -3.419 ms

# Below is generated by plot.py at 2018-01-26 00:19:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 59.534 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 1.71 Mbit/s
95th percentile per-packet one-way delay: 59.534 ms
Loss rate: 0.10%
```
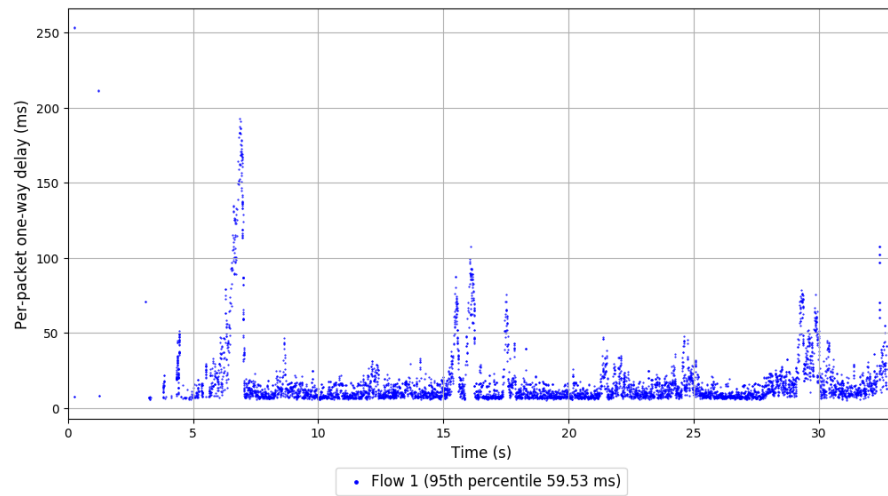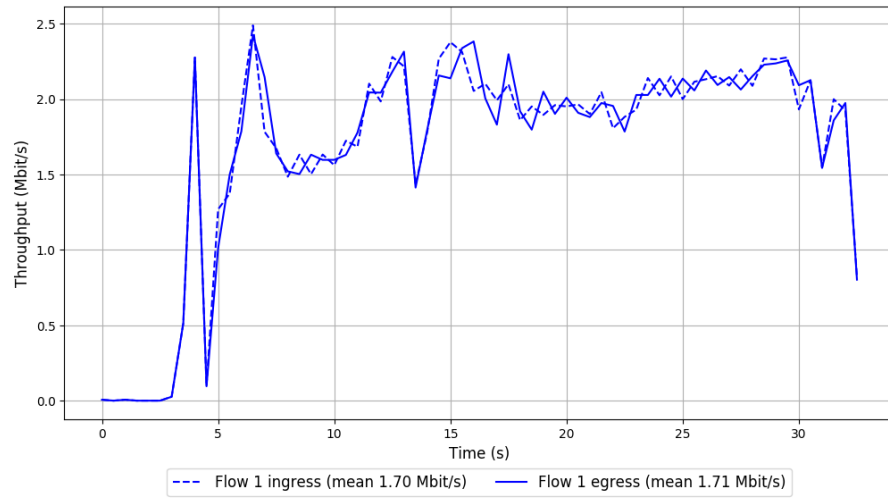
Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-01-25 22:20:35
End at: 2018-01-25 22:21:05
Local clock offset: -3.469 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.89 Mbit/s
95th percentile per-packet one-way delay: 61.054 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 12.89 Mbit/s
95th percentile per-packet one-way delay: 61.054 ms
Loss rate: 0.00%
```
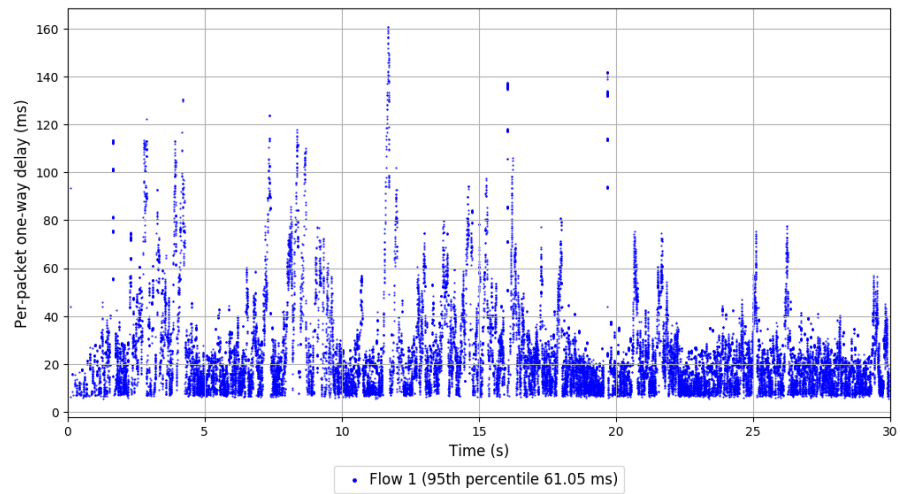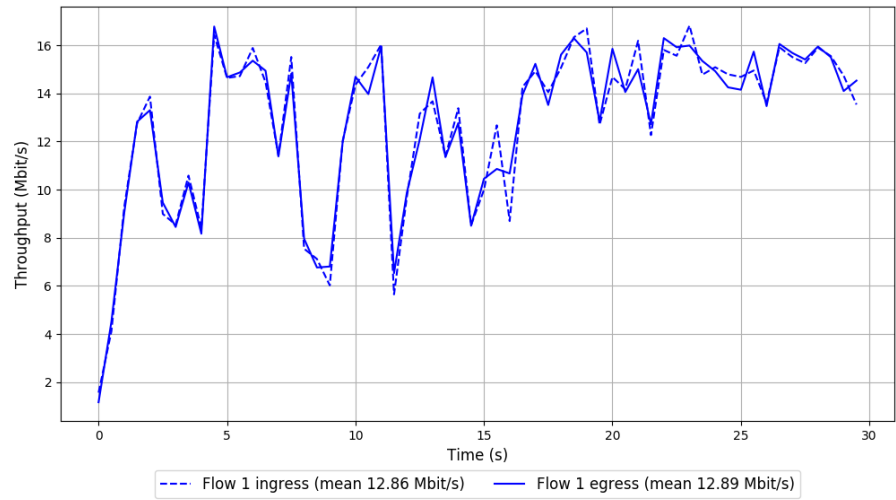
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-01-25 23:07:18
End at: 2018-01-25 23:07:48
Local clock offset: -2.439 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.87 Mbit/s
95th percentile per-packet one-way delay: 74.799 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 7.87 Mbit/s
95th percentile per-packet one-way delay: 74.799 ms
Loss rate: 0.11%
```
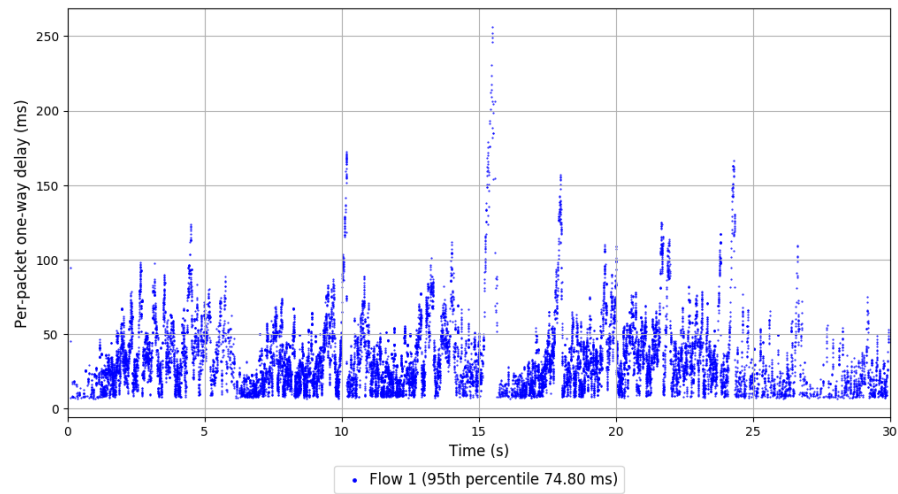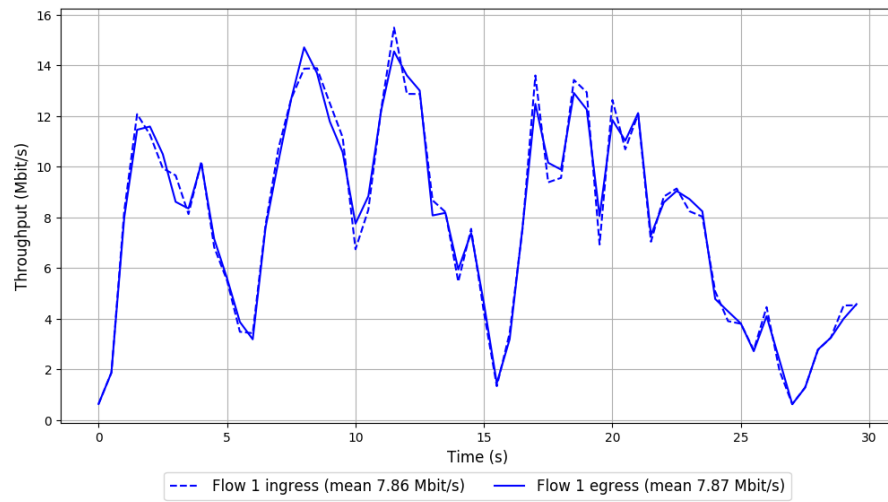
Run 2: Report of Sprout — Data Link

Flow 1 ingress (mean 7.86 Mbit/s)   Flow 1 egress (mean 7.87 Mbit/s)

Flow 1 (95th percentile 74.80 ms)

```
Run 3: Statistics of Sprout

Start at: 2018-01-25 23:54:02
End at: 2018-01-25 23:54:32
Local clock offset: -3.393 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.32 Mbit/s
95th percentile per-packet one-way delay: 69.493 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 11.32 Mbit/s
95th percentile per-packet one-way delay: 69.493 ms
Loss rate: 0.00%
```
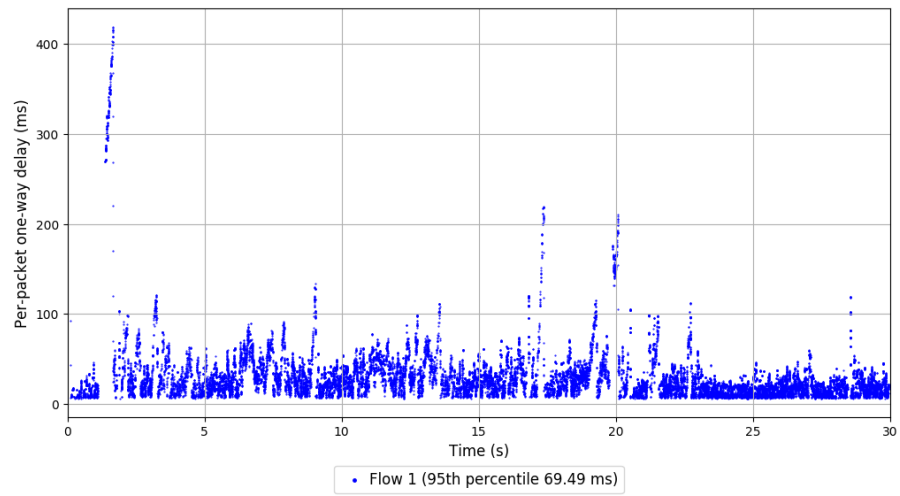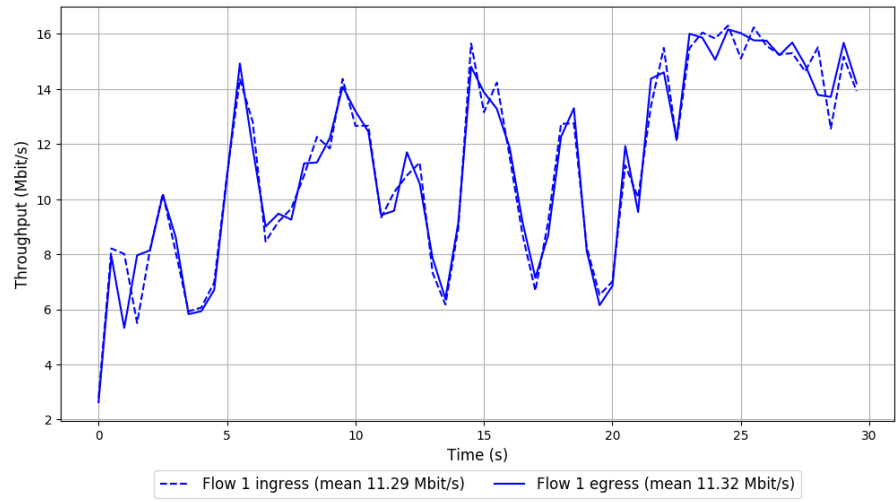
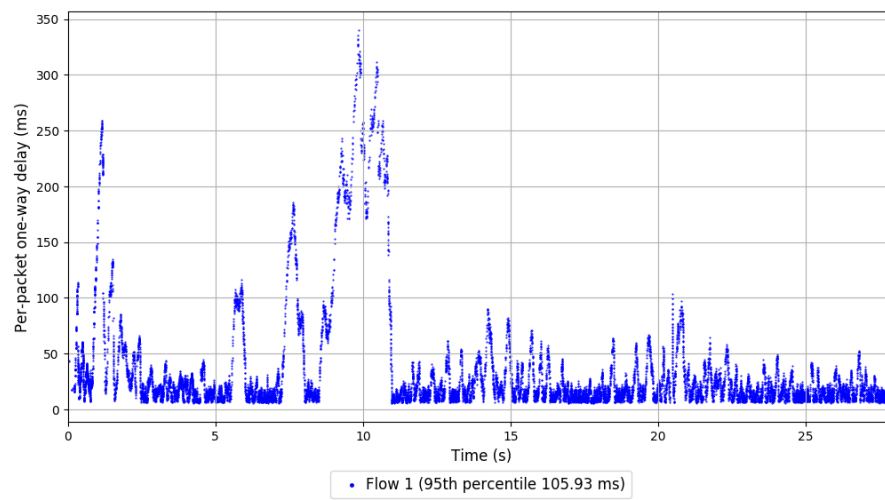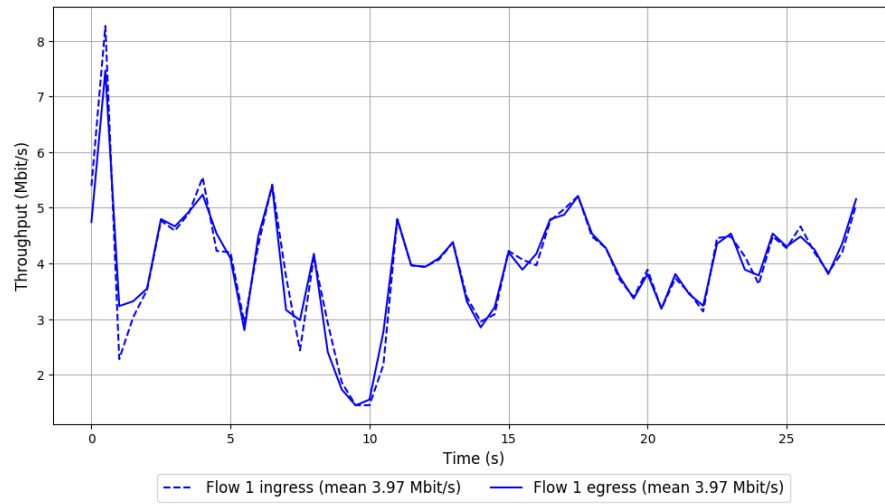Run 3: Report of Sprout — Data Link

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

Start at: 2018-01-25 22:26:25
End at: 2018-01-25 22:26:55
Local clock offset: -3.516 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 105.929 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 105.929 ms
Loss rate: 0.00%
```

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

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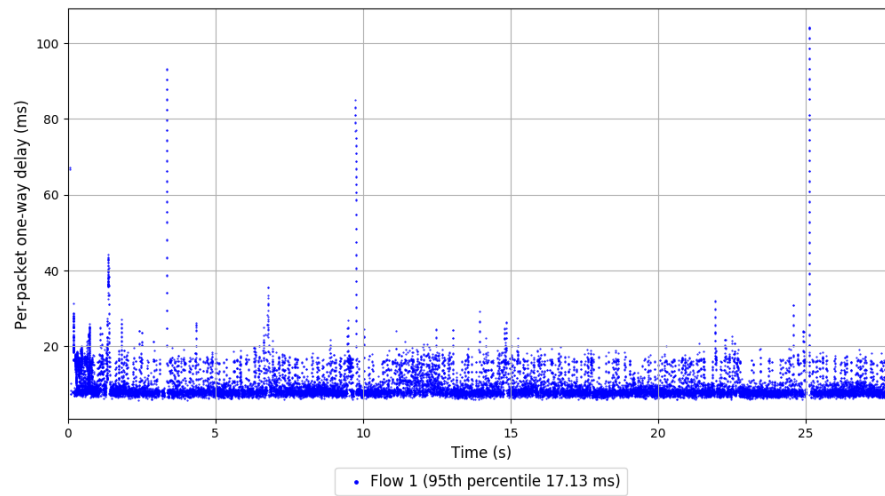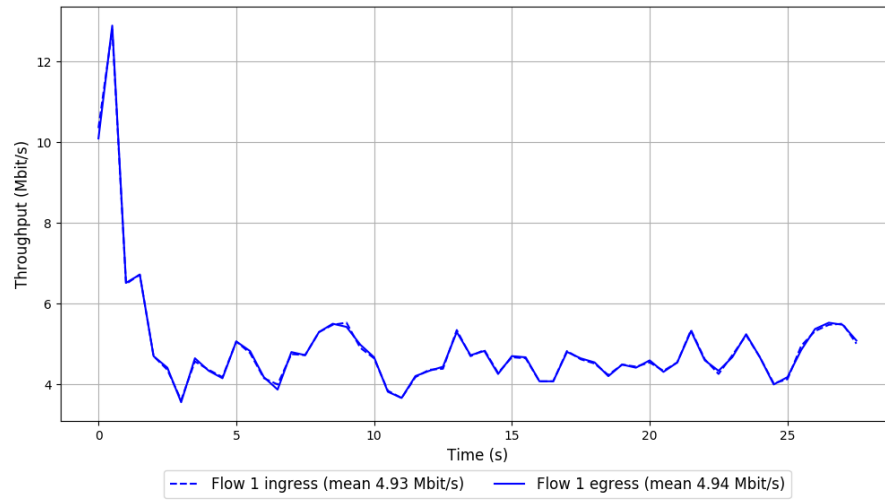

Flow 1 (95th percentile 105.93 ms)

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

Start at: 2018-01-25 23:13:08
End at: 2018-01-25 23:13:38
Local clock offset: -2.826 ms


# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.94 Mbit/s
95th percentile per-packet one-way delay: 17.133 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 4.94 Mbit/s
95th percentile per-packet one-way delay: 17.133 ms
Loss rate: 0.00%
```

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

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

Start at: 2018-01-25 23:59:52
End at: 2018-01-26 00:00:22
Local clock offset: -3.432 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.77 Mbit/s
95th percentile per-packet one-way delay: 94.652 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 4.77 Mbit/s
95th percentile per-packet one-way delay: 94.652 ms
Loss rate: 0.04%
```
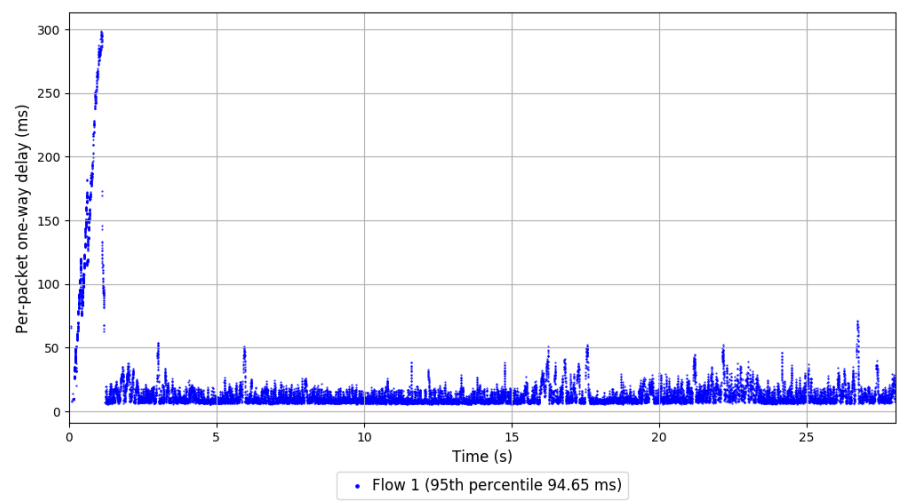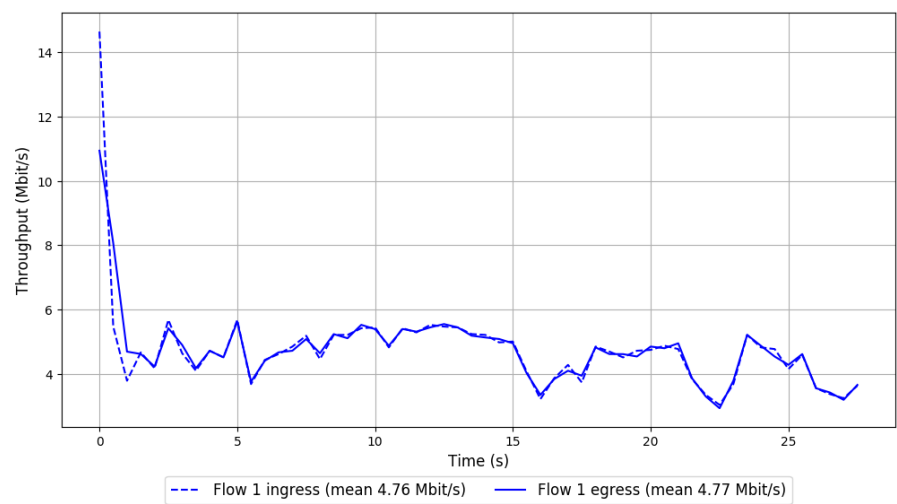
Run 3: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 4.76 Mbit/s)   Flow 1 egress (mean 4.77 Mbit/s)

Flow 1 (95th percentile 94.65 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2018-01-25 22:05:58
End at: 2018-01-25 22:06:28
Local clock offset: -3.401 ms


# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.31 Mbit/s
95th percentile per-packet one-way delay: 104.248 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 4.31 Mbit/s
95th percentile per-packet one-way delay: 104.248 ms
Loss rate: 0.01%
```
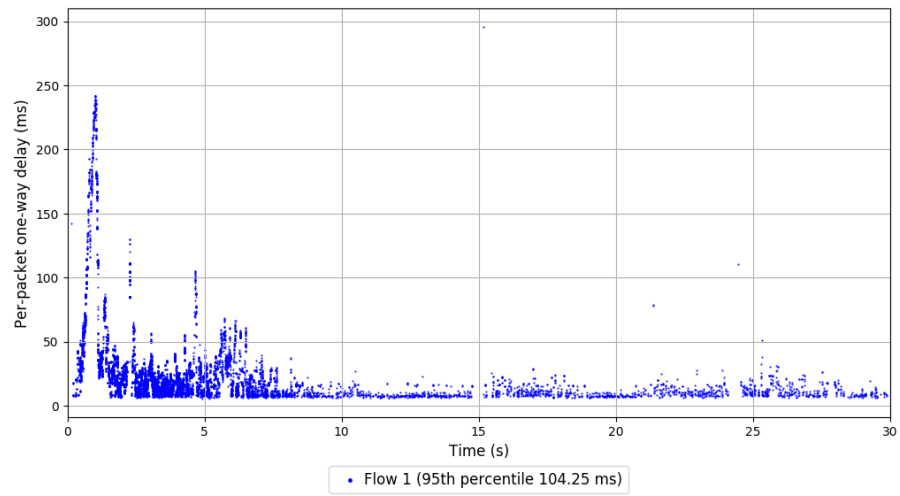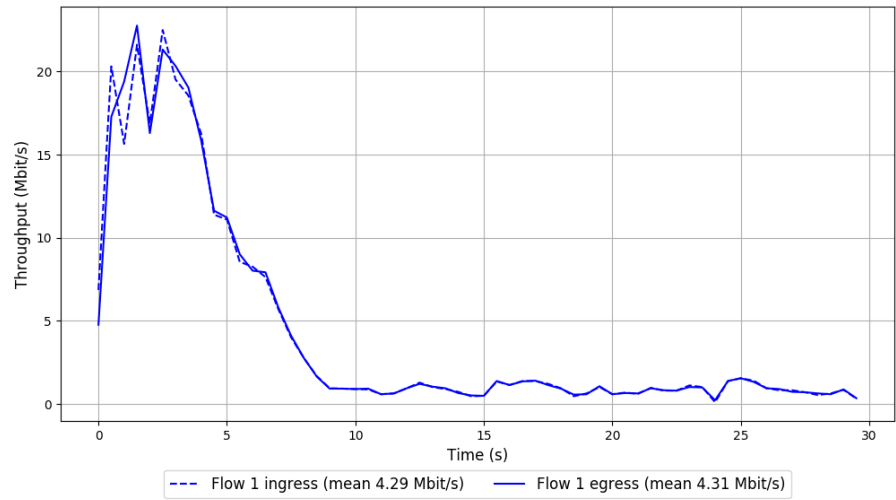
Run 1: Report of TCP Vegas — Data Link

- - - Flow 1 ingress (mean 4.29 Mbit/s) ——— Flow 1 egress (mean 4.31 Mbit/s)

• Flow 1 (95th percentile 104.25 ms)

```
Run 2: Statistics of TCP Vegas

Start at: 2018-01-25 22:52:43
End at: 2018-01-25 22:53:13
Local clock offset: -2.47 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 87.183 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 87.183 ms
Loss rate: 0.00%
```
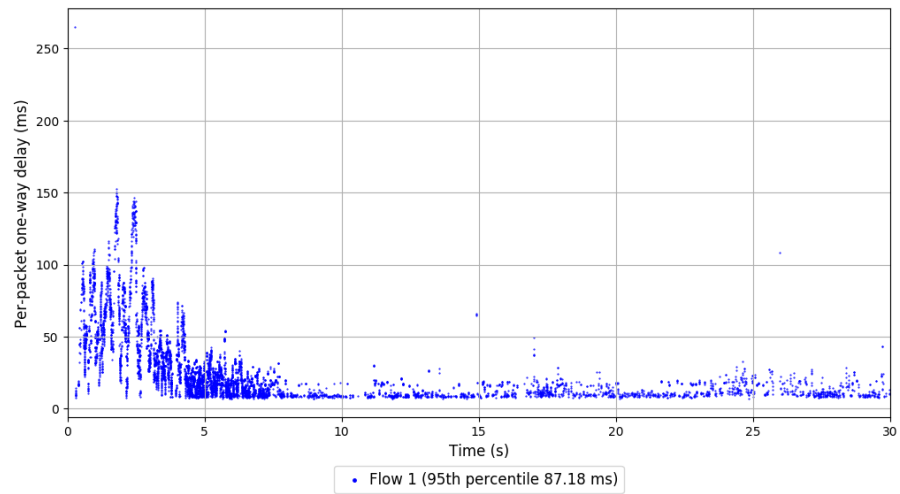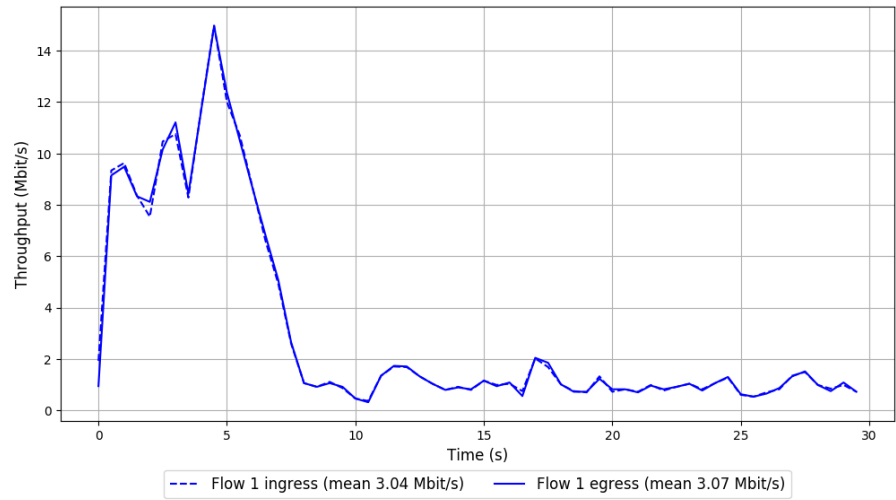
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-01-25 23:39:26
End at: 2018-01-25 23:39:56
Local clock offset: -3.383 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 21.329 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 21.329 ms
Loss rate: 0.00%
```
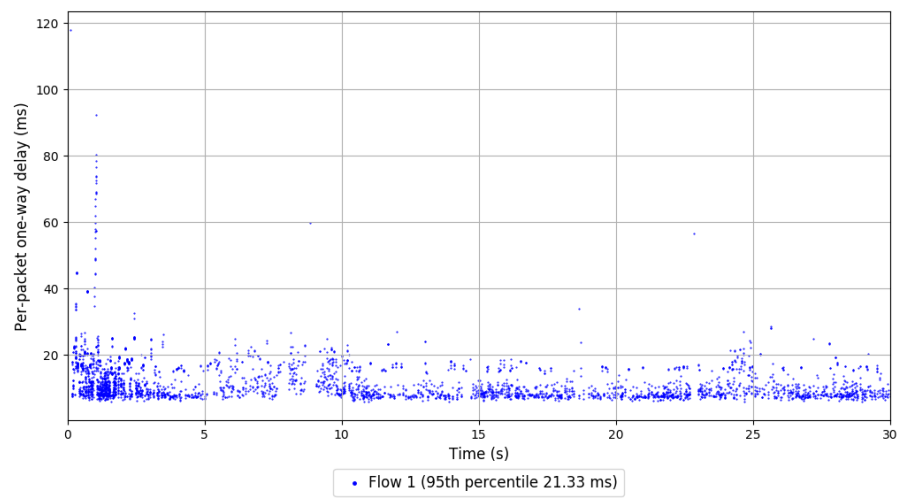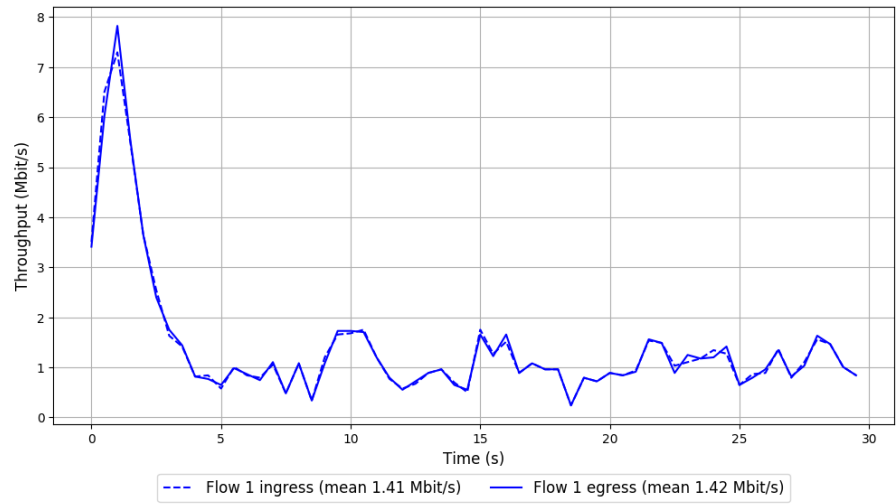
Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 1.41 Mbit/s) ---- Flow 1 egress (mean 1.42 Mbit/s)

• Flow 1 (95th percentile 21.33 ms)

```
Run 1: Statistics of Verus

Start at: 2018-01-25 22:14:44
End at: 2018-01-25 22:15:14
Local clock offset: -3.492 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 19.092 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 19.092 ms
Loss rate: 0.00%
```
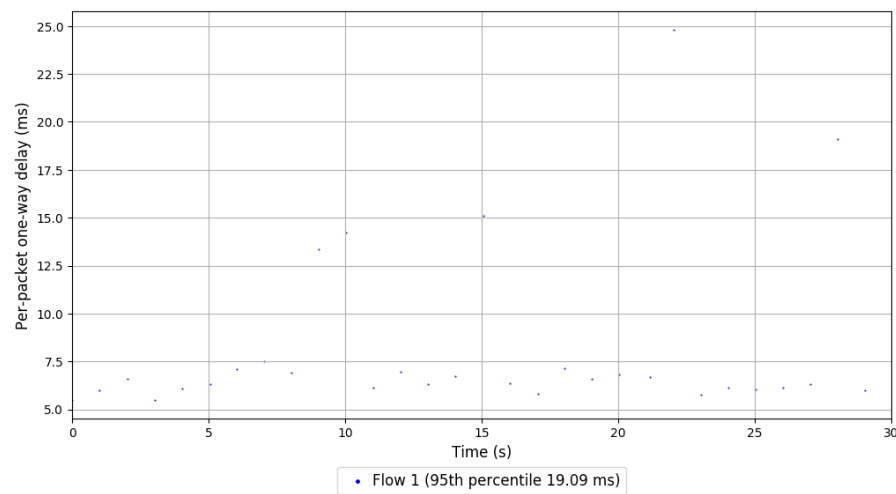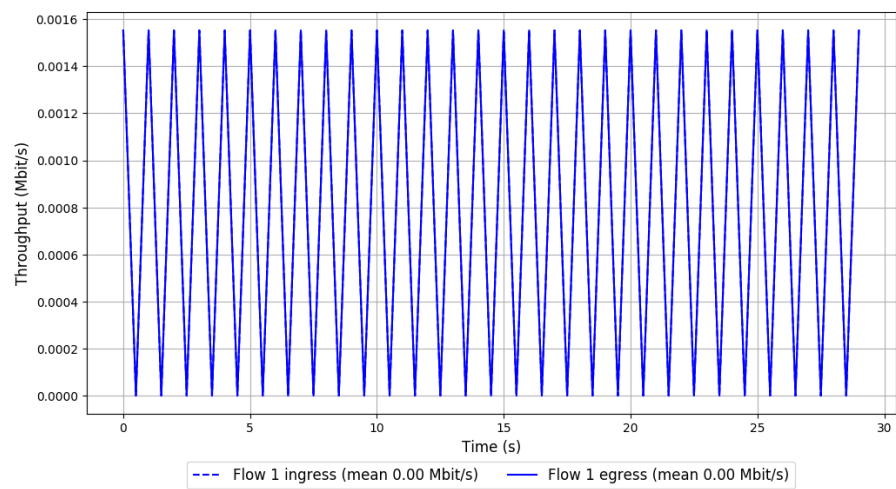
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2018-01-25 23:01:28
End at: 2018-01-25 23:01:58
Local clock offset: -2.318 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 16.027 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 16.027 ms
Loss rate: 0.00%
```
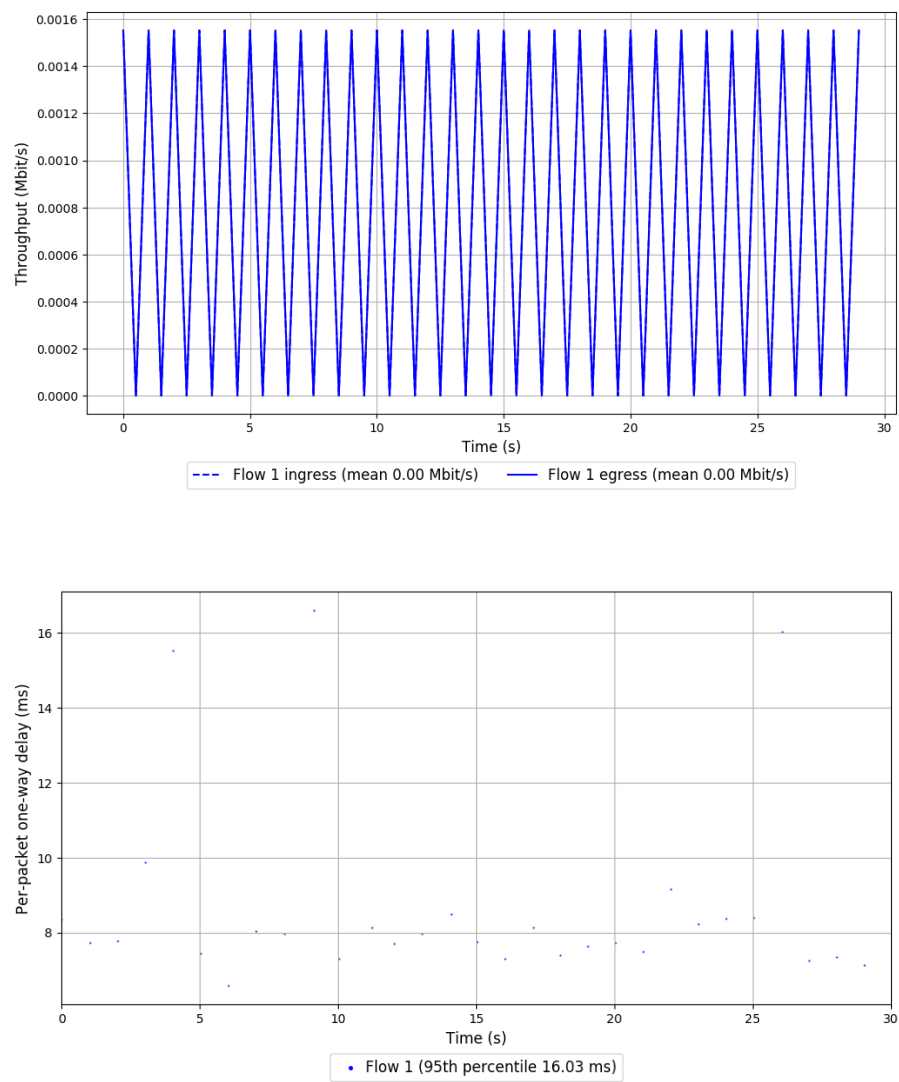
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-01-25 23:48:12
End at: 2018-01-25 23:48:42
Local clock offset: -3.438 ms

# Below is generated by plot.py at 2018-01-26 00:19:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 15.333 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 15.333 ms
Loss rate: 0.00%
```
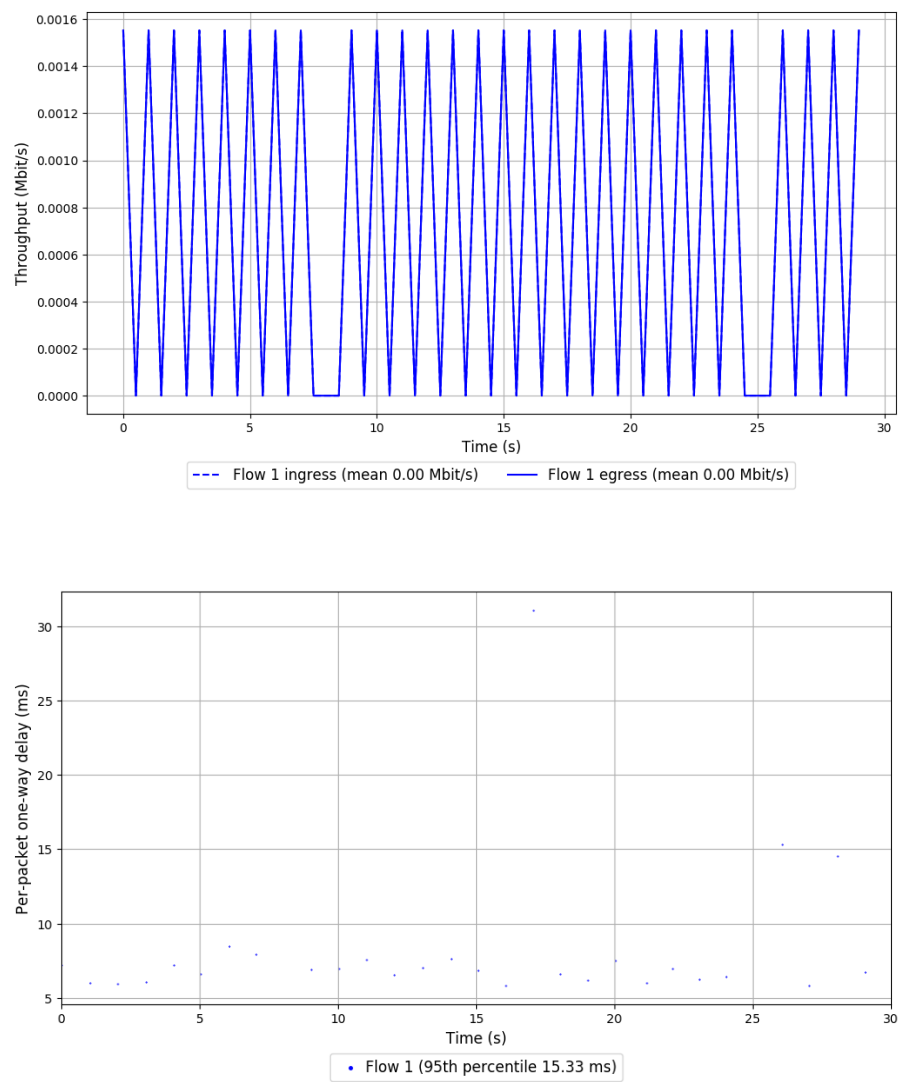
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of Copa

Start at: 2018-01-25 22:32:16
End at: 2018-01-25 22:32:46
Local clock offset: -3.318 ms

# Below is generated by plot.py at 2018-01-26 00:19:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 113.955 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 2.41 Mbit/s
95th percentile per-packet one-way delay: 113.955 ms
Loss rate: 0.04%
```
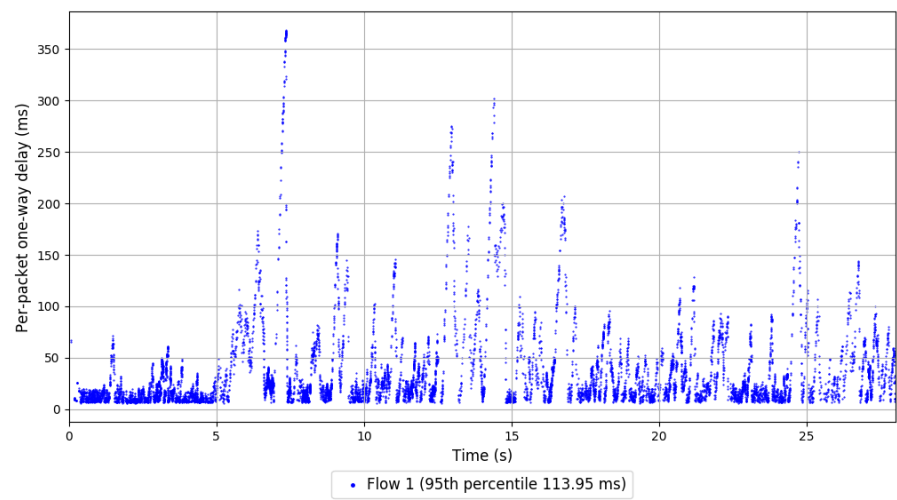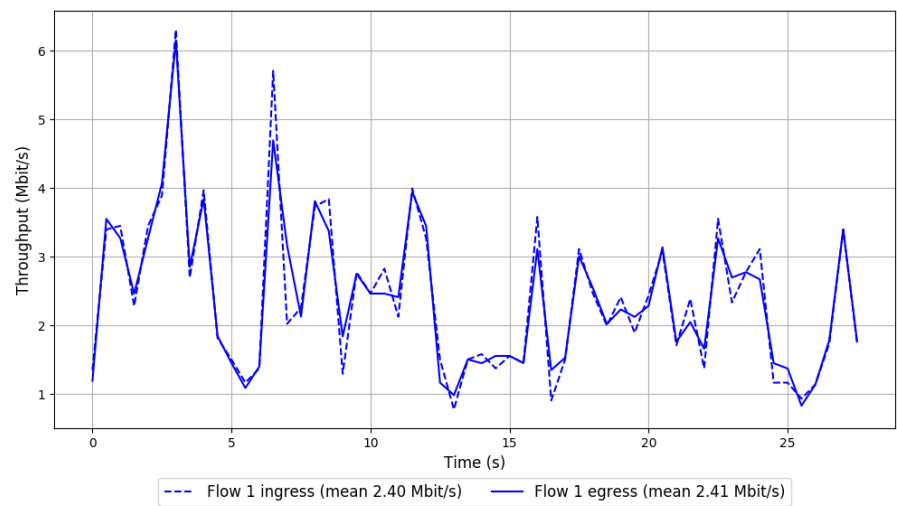
Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 2.40 Mbit/s)   Flow 1 egress (mean 2.41 Mbit/s)

Flow 1 (95th percentile 113.95 ms)

```
Run 2: Statistics of Copa

Start at: 2018-01-25 23:18:59
End at: 2018-01-25 23:19:29
Local clock offset: -3.142 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.75 Mbit/s
95th percentile per-packet one-way delay: 48.267 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 9.75 Mbit/s
95th percentile per-packet one-way delay: 48.267 ms
Loss rate: 0.00%
```
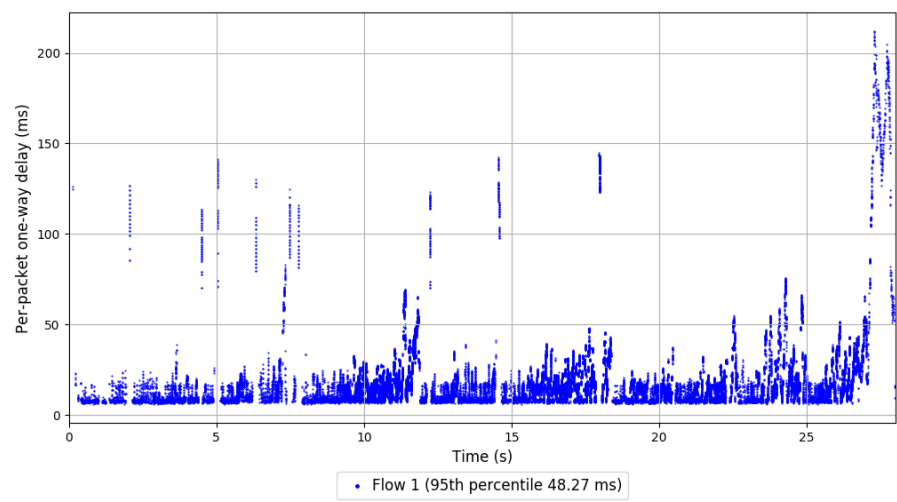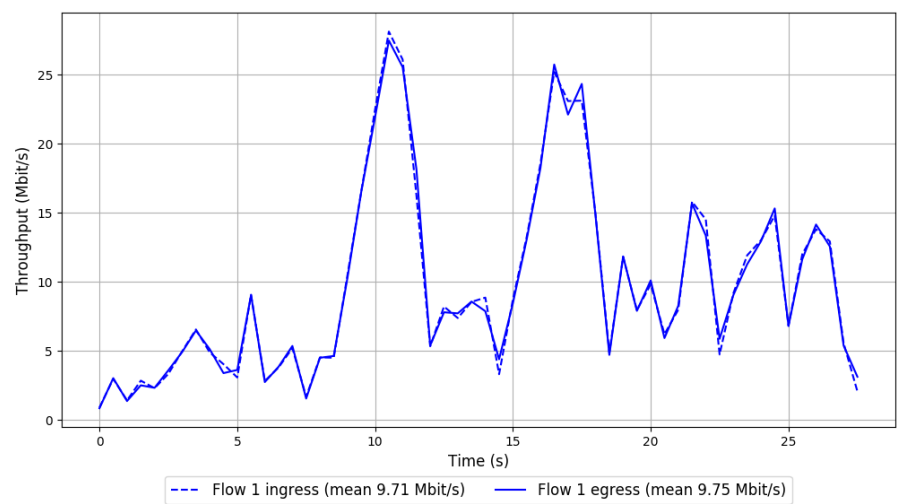
Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-01-26 00:05:42
End at: 2018-01-26 00:06:12
Local clock offset: -3.537 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 48.881 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 48.881 ms
Loss rate: 0.00%
```
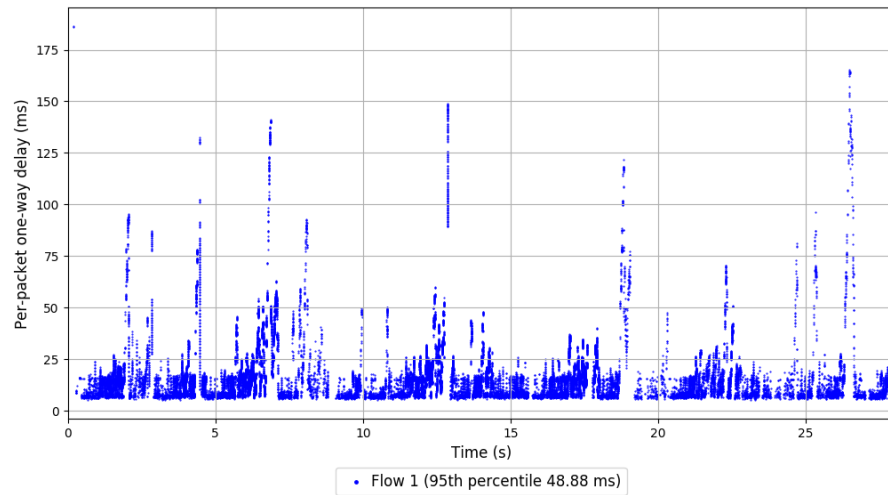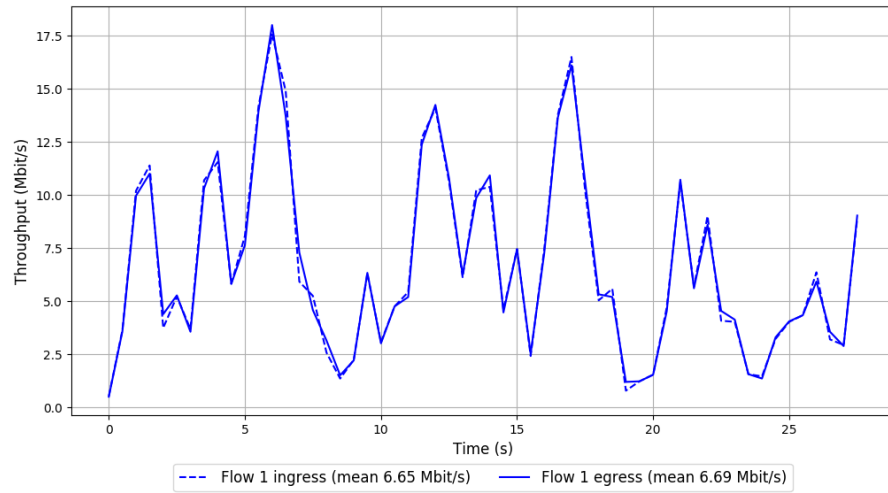
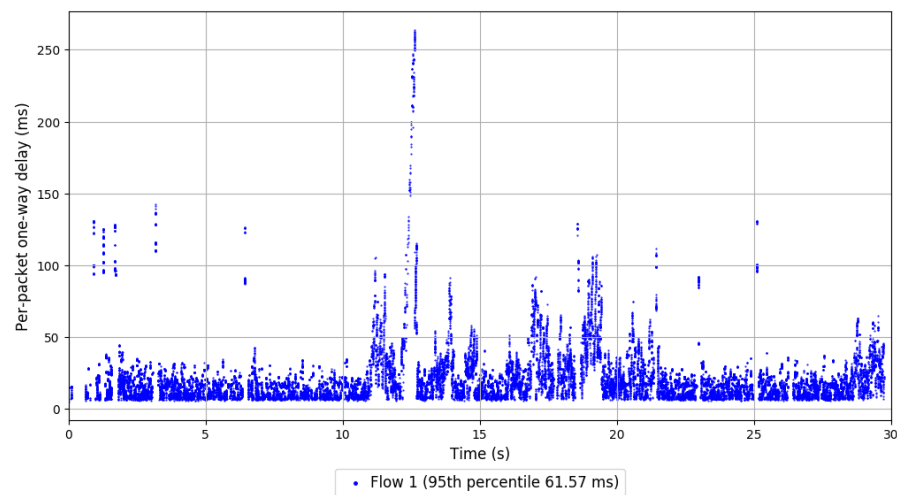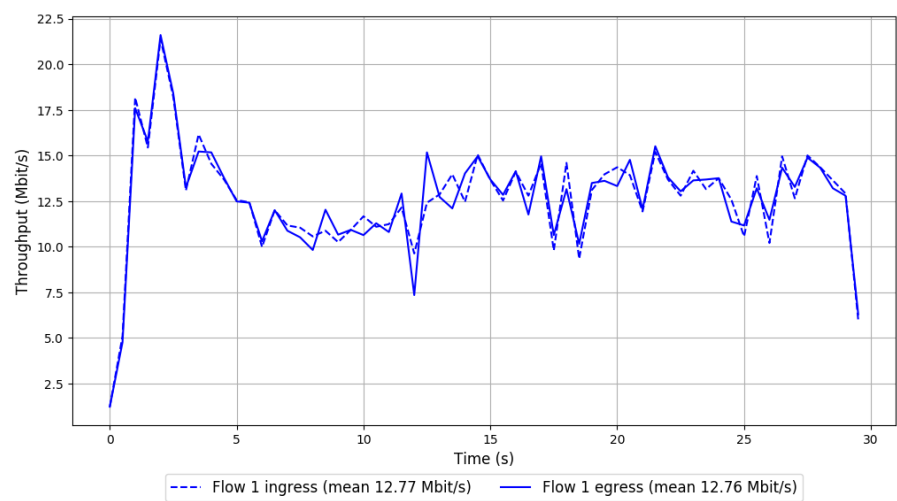Run 3: Report of Copa — Data Link

```
Run 1: Statistics of Indigo-2-256

Start at: 2018-01-25 22:08:53
End at: 2018-01-25 22:09:23
Local clock offset: -3.441 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.76 Mbit/s
95th percentile per-packet one-way delay: 61.567 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 12.76 Mbit/s
95th percentile per-packet one-way delay: 61.567 ms
Loss rate: 0.05%
```

Run 1: Report of Indigo-2-256 — Data Link

```
Run 2: Statistics of Indigo-2-256

Start at: 2018-01-25 22:55:38
End at: 2018-01-25 22:56:08
Local clock offset: -2.462 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 190.865 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 190.865 ms
Loss rate: 0.06%
```
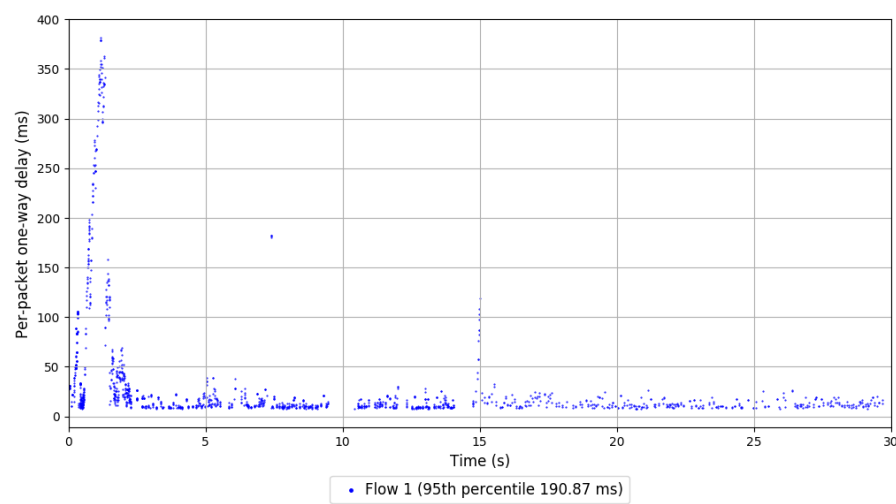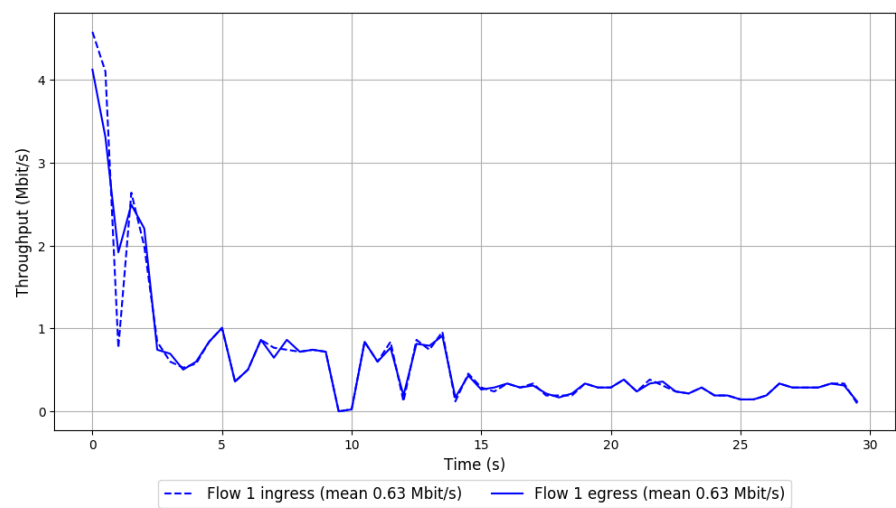
Run 2: Report of Indigo-2-256 — Data Link

Flow 1 ingress (mean 0.63 Mbit/s)   Flow 1 egress (mean 0.63 Mbit/s)

Flow 1 (95th percentile 190.87 ms)

```
Run 3: Statistics of Indigo-2-256

Start at: 2018-01-25 23:42:21
End at: 2018-01-25 23:42:51
Local clock offset: -3.393 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 28.508 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 28.508 ms
Loss rate: 0.00%
```
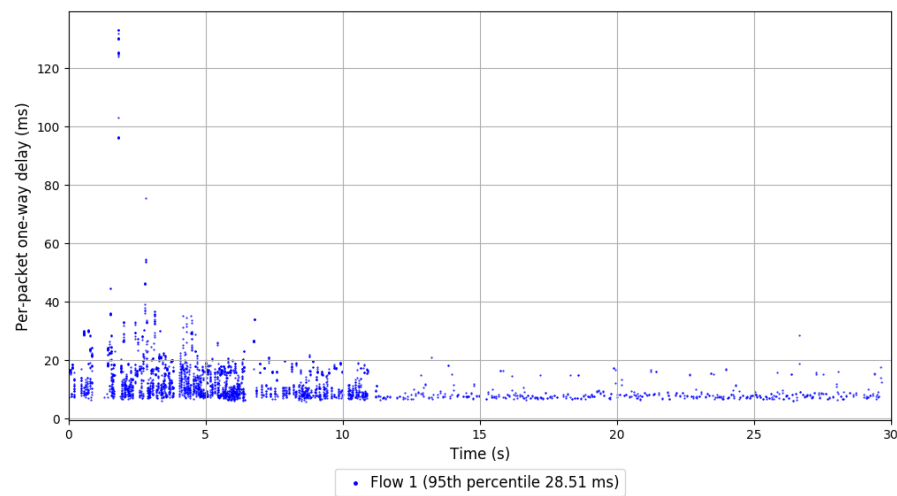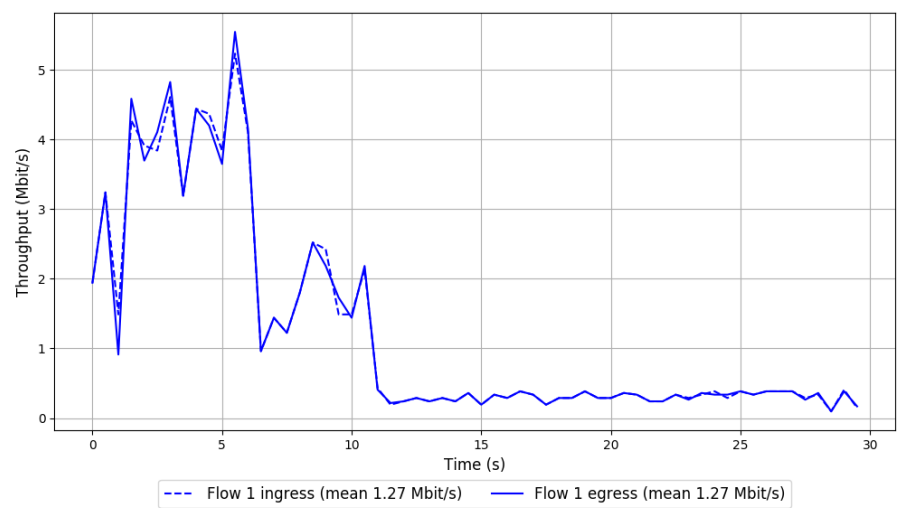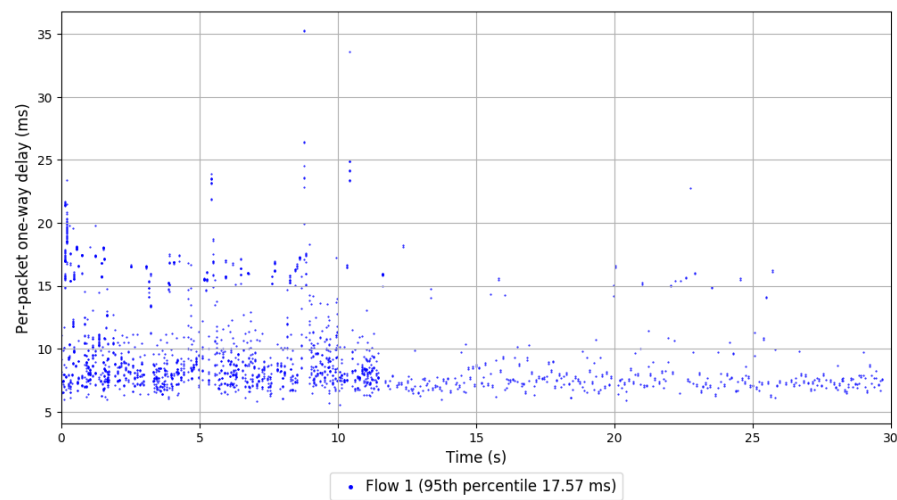
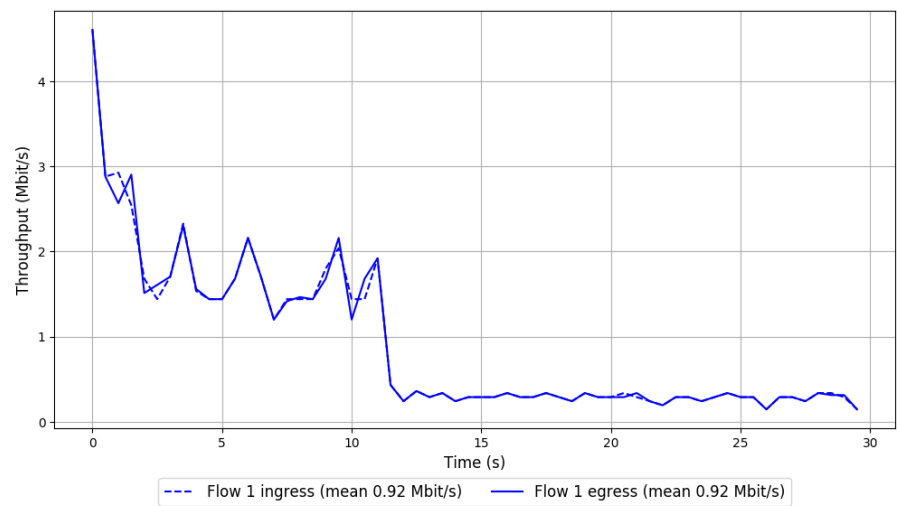Run 3: Report of Indigo-2-256 — Data Link

```
Run 1: Statistics of Indigo-1-32

Start at: 2018-01-25 22:11:49
End at: 2018-01-25 22:12:19
Local clock offset: -3.555 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 17.568 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 17.568 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo-1-32 — Data Link

```
Run 2: Statistics of Indigo-1-32

Start at: 2018-01-25 22:58:33
End at: 2018-01-25 22:59:03
Local clock offset: -2.328 ms


# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 33.599 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 33.599 ms
Loss rate: 0.00%
```
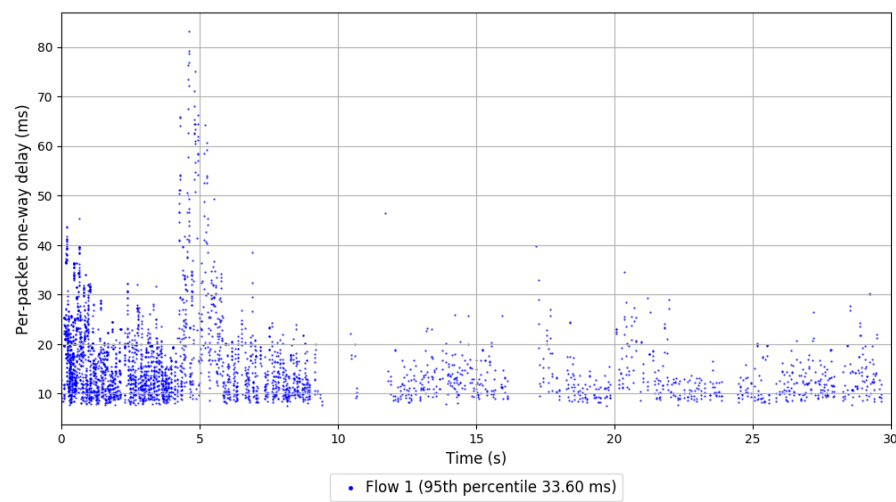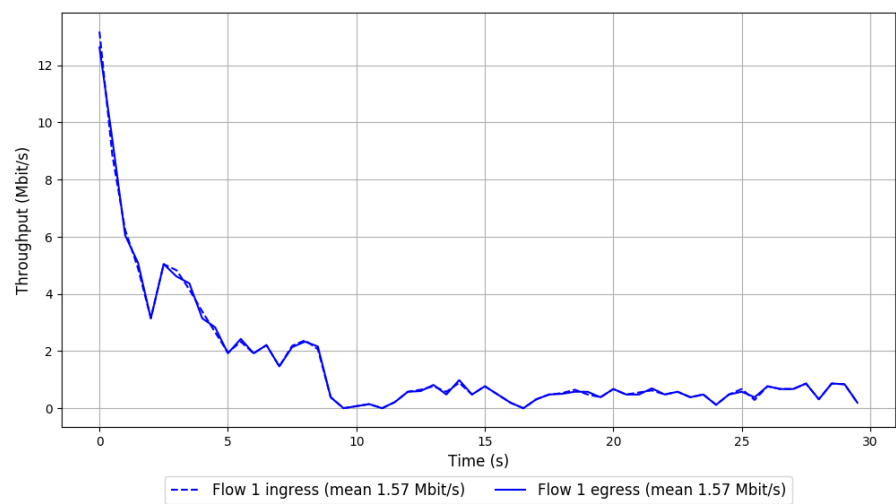
Run 2: Report of Indigo-1-32 — Data Link

```
Run 3: Statistics of Indigo-1-32

Start at: 2018-01-25 23:45:17
End at: 2018-01-25 23:45:47
Local clock offset: -3.349 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 36.213 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 36.213 ms
Loss rate: 0.00%
```
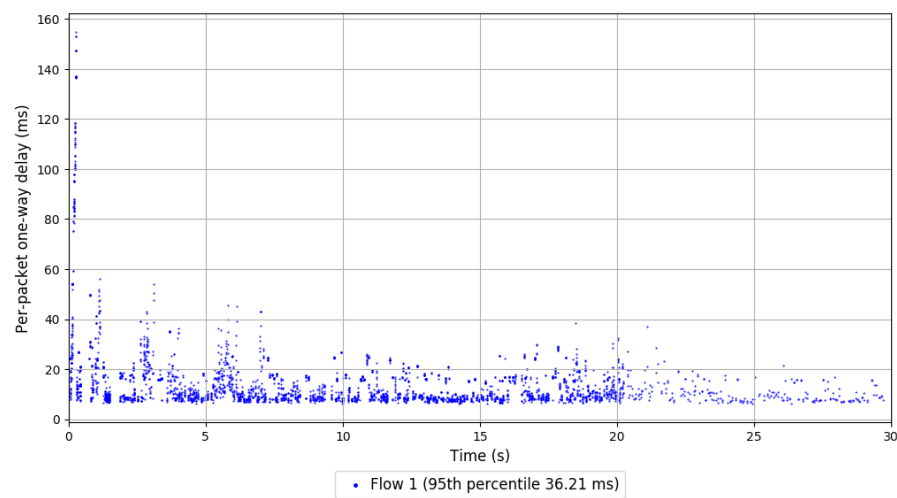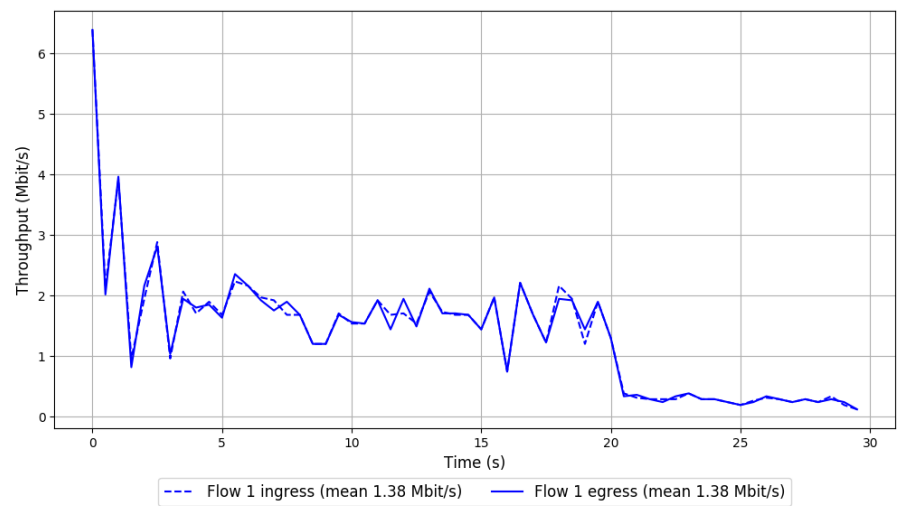
Run 3: Report of Indigo-1-32 — Data Link

Flow 1 ingress (mean 1.38 Mbit/s) — — —   Flow 1 egress (mean 1.38 Mbit/s) ———
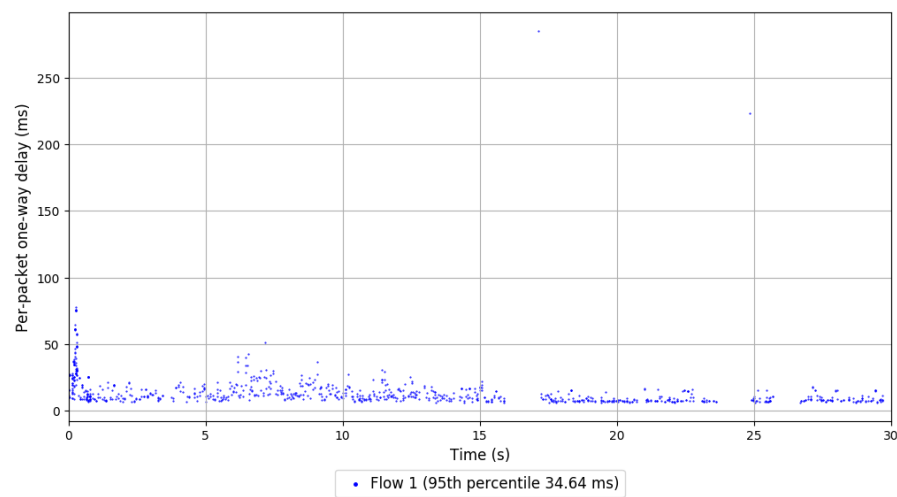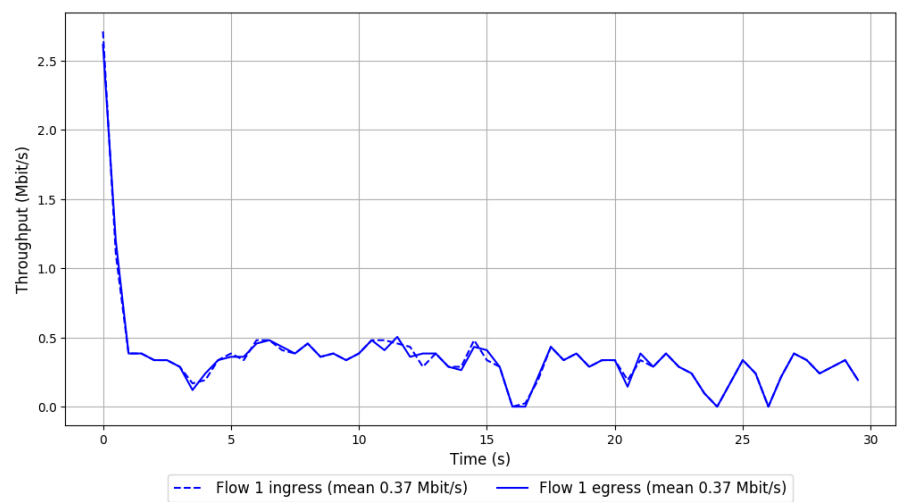

Flow 1 (95th percentile 36.21 ms)

```
Run 1: Statistics of Indigo-1-128

Start at: 2018-01-25 22:03:03
End at: 2018-01-25 22:03:33
Local clock offset: -3.524 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 34.643 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 34.643 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo-1-128 — Data Link

```
Run 2: Statistics of Indigo-1-128

Start at: 2018-01-25 22:49:48
End at: 2018-01-25 22:50:18
Local clock offset: -2.514 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 27.635 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.62 Mbit/s
95th percentile per-packet one-way delay: 27.635 ms
Loss rate: 0.00%
```
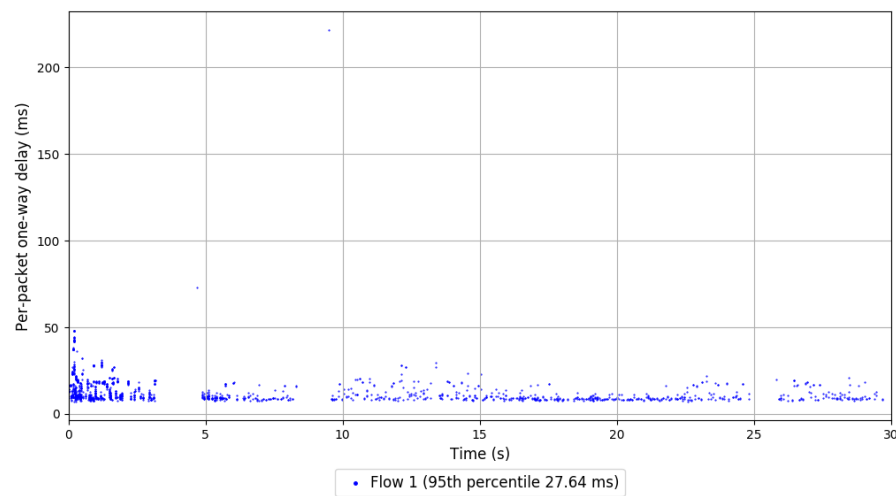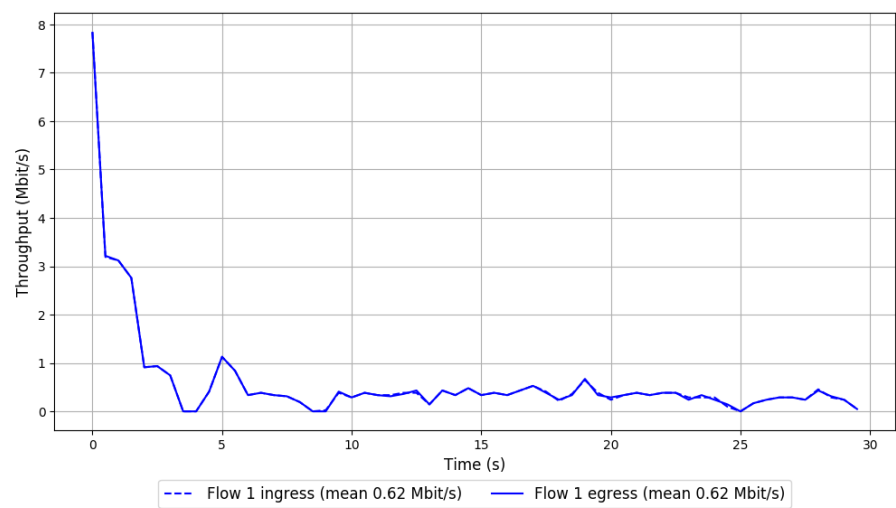
Run 2: Report of Indigo-1-128 — Data Link

```
Run 3: Statistics of Indigo-1-128

Start at: 2018-01-25 23:36:31
End at: 2018-01-25 23:37:01
Local clock offset: -3.353 ms

# Below is generated by plot.py at 2018-01-26 00:19:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 37.442 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 37.442 ms
Loss rate: 0.00%
```

Run 3: Report of Indigo-1-128 — Data Link