Pantheon Report

Generated at 2018-01-26 00:18:34 (UTC).

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

Repeated the test of 15 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

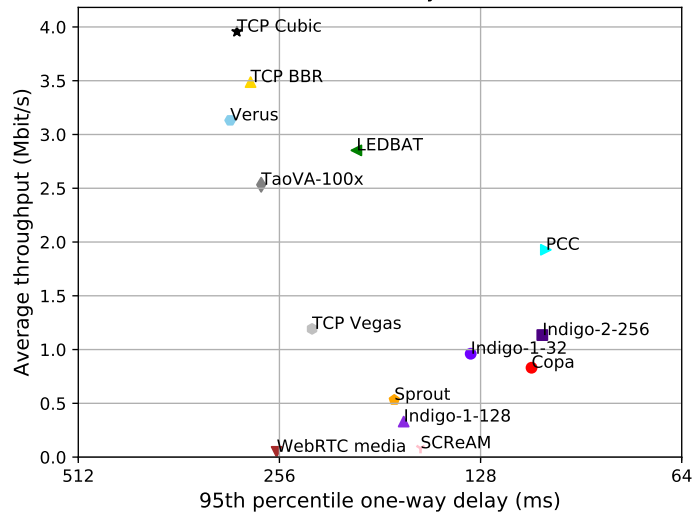Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

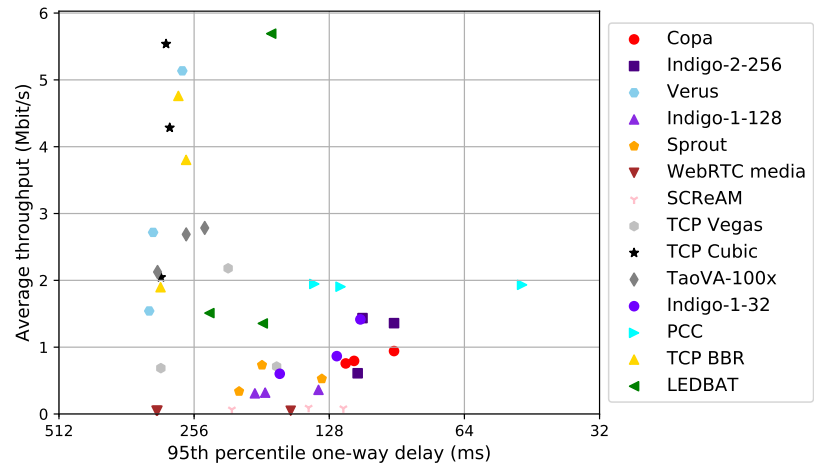NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

```
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 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	3.49	282.77	1.59
TCP Cubic	3	3.96	296.39	1.59
LEDBAT	3	2.85	196.37	0.64
PCC	3	1.93	102.21	1.03
QUIC Cubic	0	N/A	N/A	N/A
SCReAM	3	0.08	157.42	5.45
WebRTC media	3	0.05	258.47	3.16
Sprout	3	0.53	172.32	1.36
TaoVA-100x	3	2.53	272.61	2.79
TCP Vegas	3	1.19	228.78	1.99
Verus	3	3.13	303.40	11.85
Copa	3	0.83	107.39	1.76
Indigo-2-256	3	1.14	103.47	0.36
Indigo-1-32	3	0.96	132.43	1.12
Indigo-1-128	3	0.33	166.84	2.40

```
Run 1: Statistics of TCP BBR

Start at: 2018-01-25 20:15:04
End at: 2018-01-25 20:15:34
Local clock offset: -3.257 ms

# Below is generated by plot.py at 2018-01-26 00:18:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 304.085 ms
Loss rate: 3.18%
-- Flow 1:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 304.085 ms
Loss rate: 3.18%
```
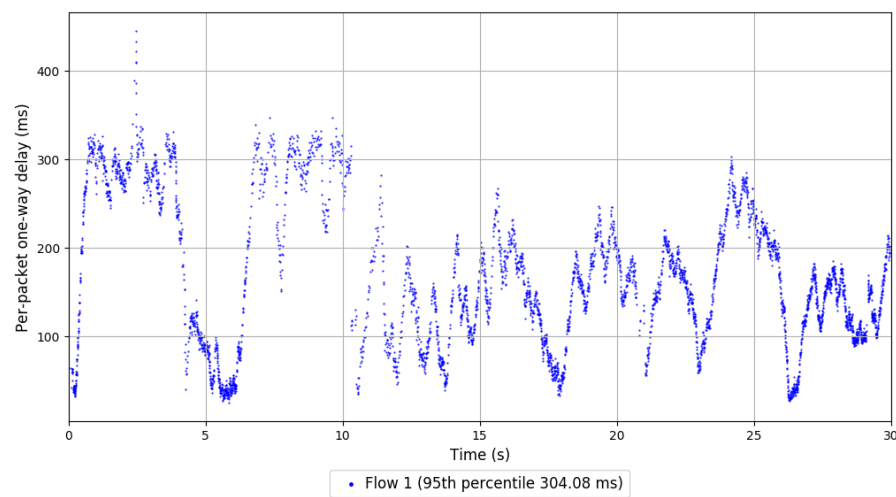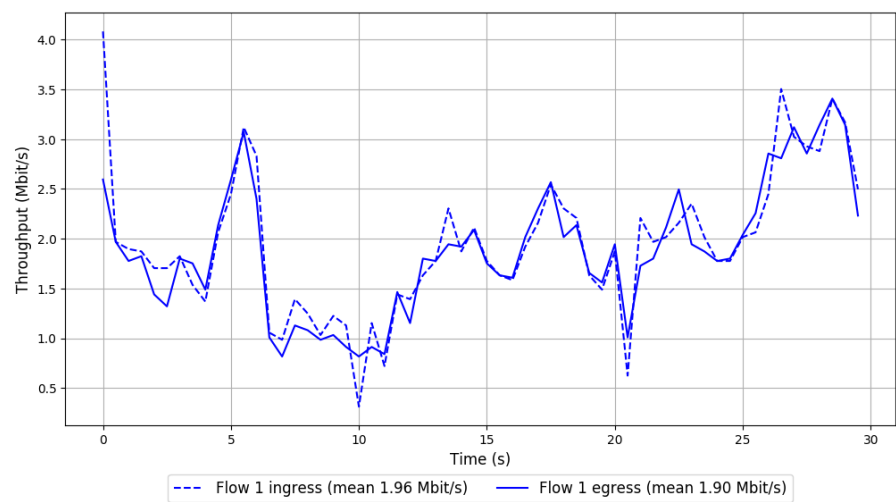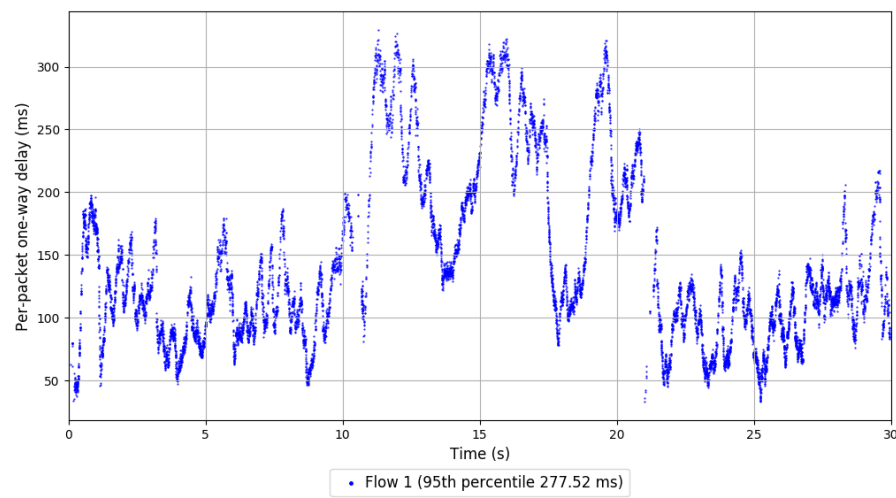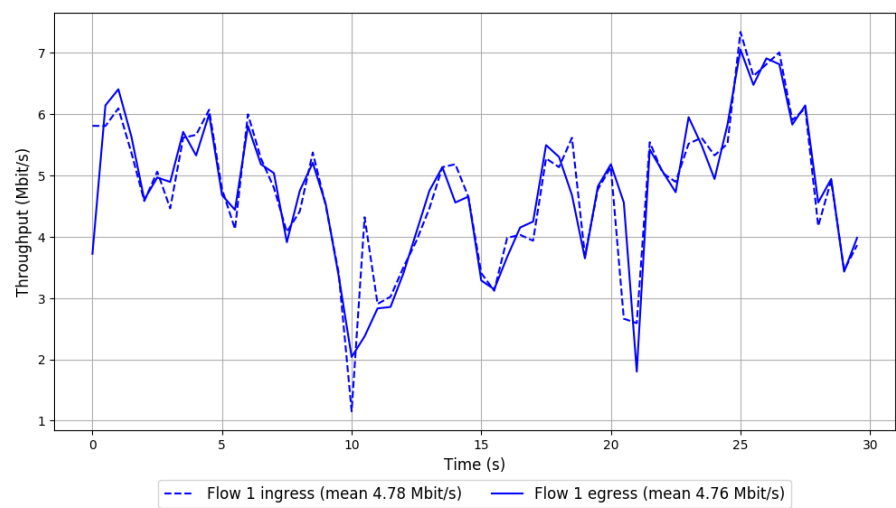
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-01-25 21:01:46
End at: 2018-01-25 21:02:16
Local clock offset: -3.505 ms

# Below is generated by plot.py at 2018-01-26 00:18:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.76 Mbit/s
95th percentile per-packet one-way delay: 277.519 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 4.76 Mbit/s
95th percentile per-packet one-way delay: 277.519 ms
Loss rate: 0.70%
```
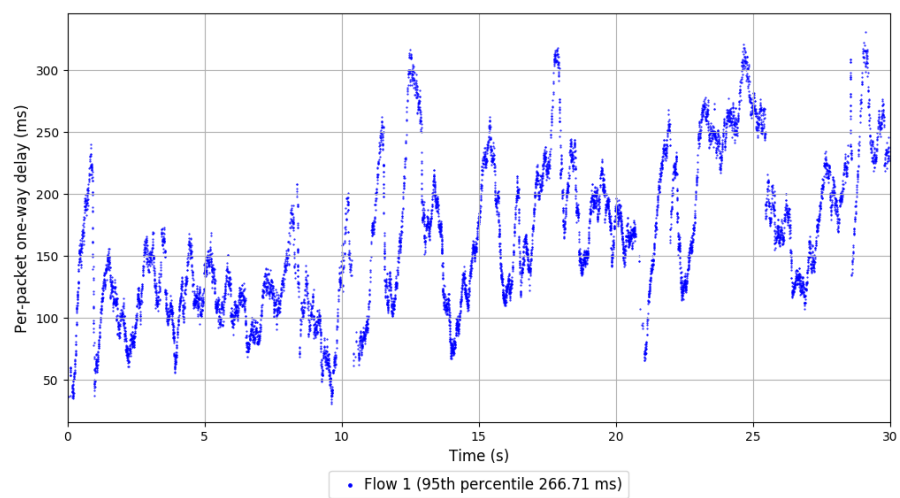
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-01-25 21:48:28
End at: 2018-01-25 21:48:58
Local clock offset: -3.54 ms


# Below is generated by plot.py at 2018-01-26 00:18:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 266.712 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 266.712 ms
Loss rate: 0.88%
```
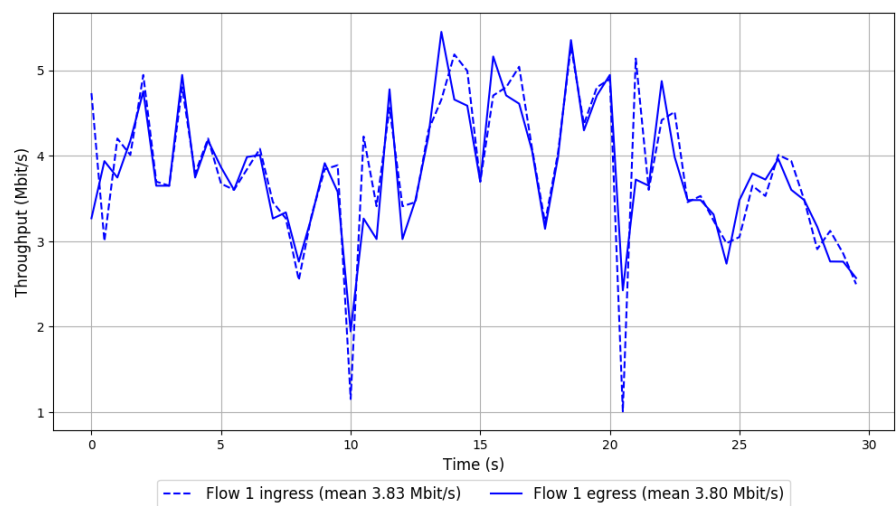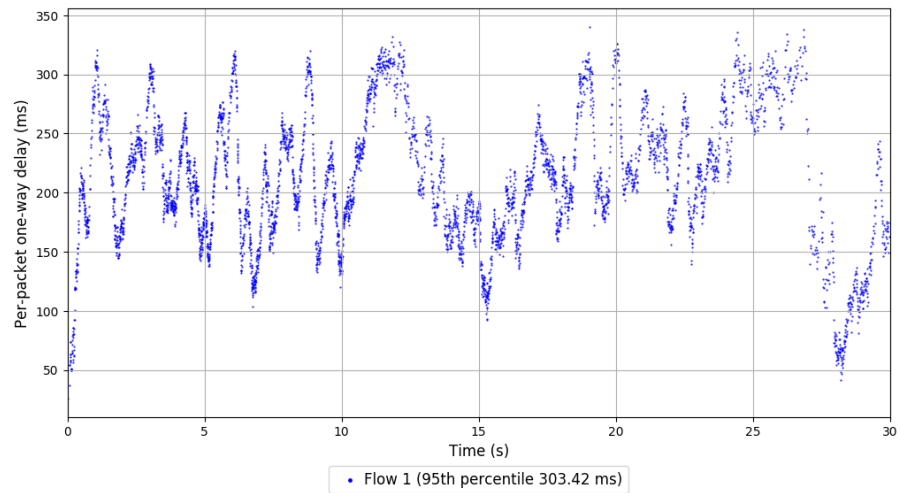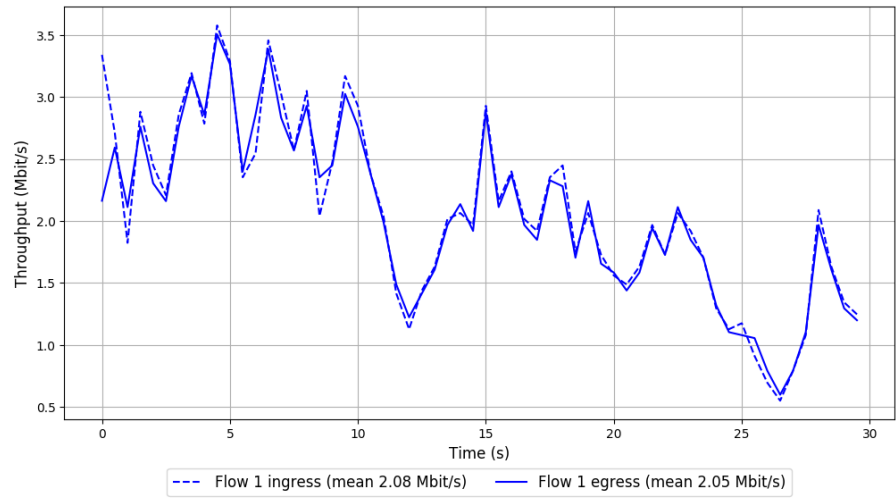
Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 3.83 Mbit/s) ---   Flow 1 egress (mean 3.80 Mbit/s) ——

• Flow 1 (95th percentile 266.71 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-01-25 20:12:09
End at: 2018-01-25 20:12:39
Local clock offset: -3.231 ms

# Below is generated by plot.py at 2018-01-26 00:18:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 303.421 ms
Loss rate: 1.66%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 303.421 ms
Loss rate: 1.66%
```
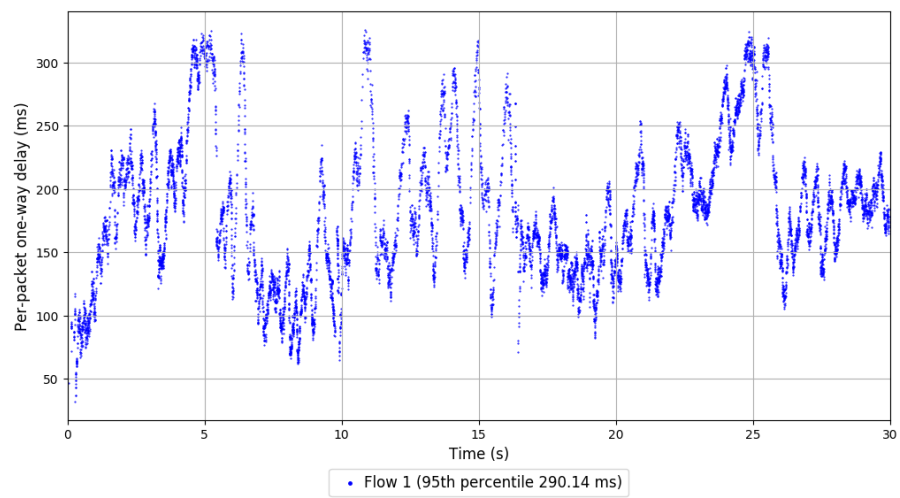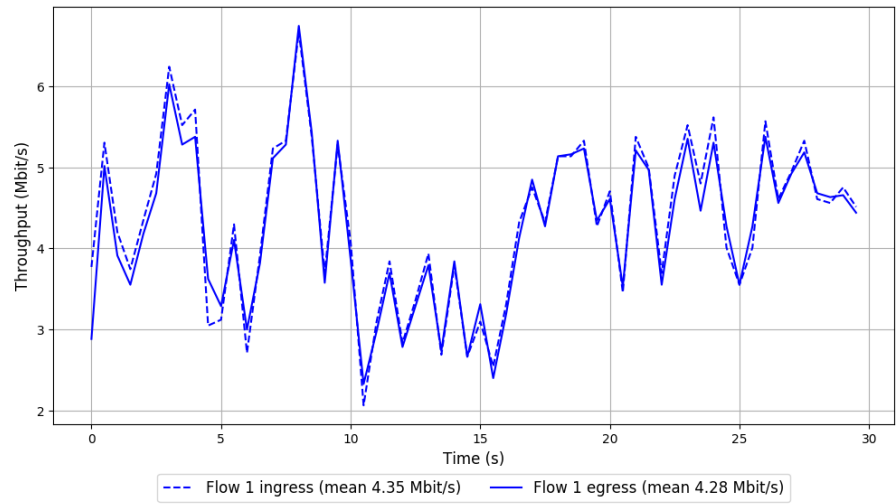
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 2.08 Mbit/s) — — —   Flow 1 egress (mean 2.05 Mbit/s) ———

• Flow 1 (95th percentile 303.42 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-01-25 20:58:50
End at: 2018-01-25 20:59:20
Local clock offset: -3.571 ms

# Below is generated by plot.py at 2018-01-26 00:18:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 290.140 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 290.140 ms
Loss rate: 1.60%
```
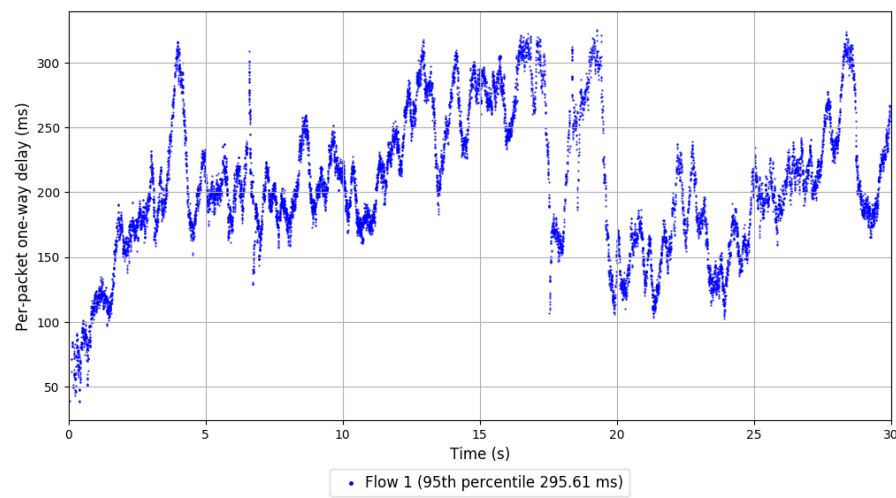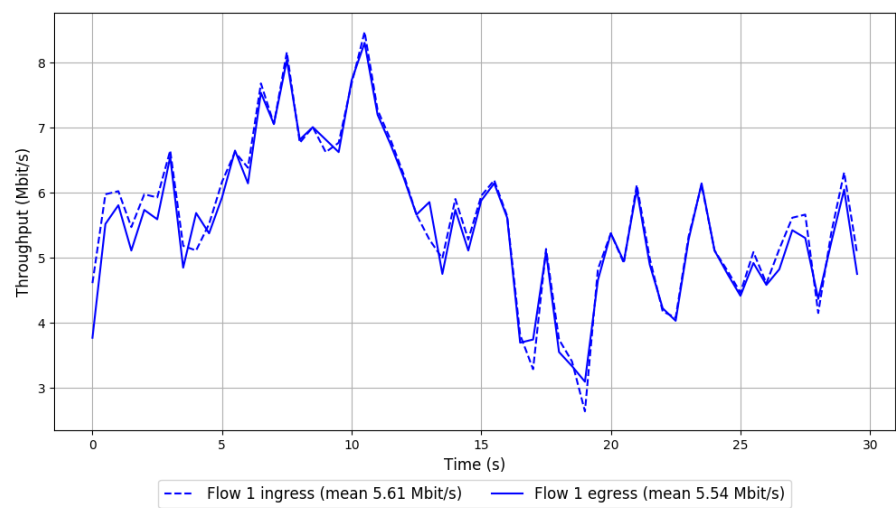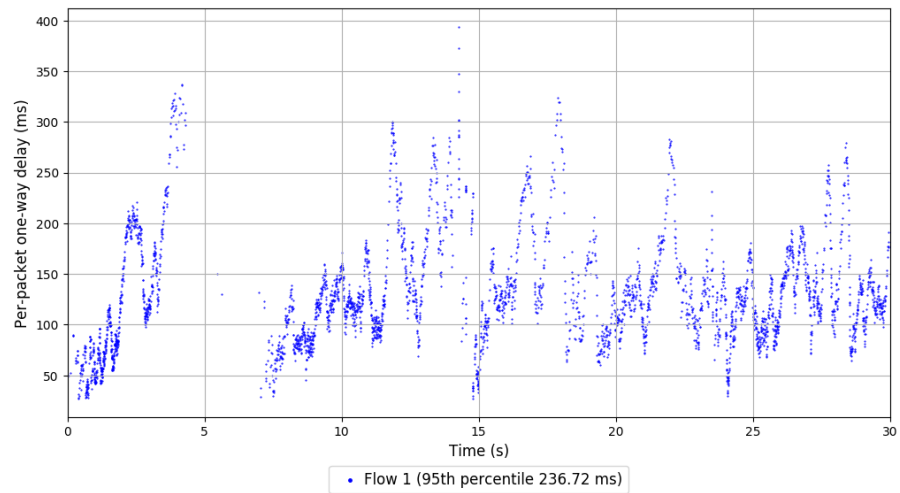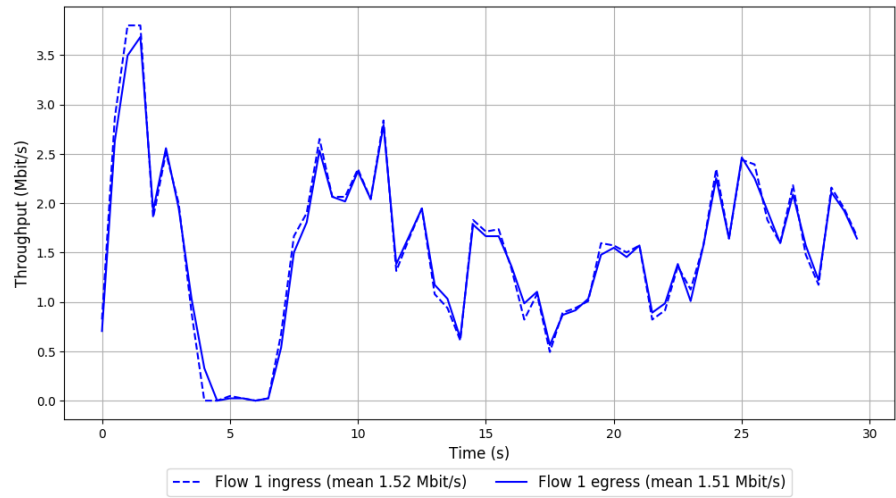
Run 2: Report of TCP Cubic — Data Link

```
Run 3: Statistics of TCP Cubic

Start at: 2018-01-25 21:45:33
End at: 2018-01-25 21:46:03
Local clock offset: -3.521 ms

# Below is generated by plot.py at 2018-01-26 00:18:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.54 Mbit/s
95th percentile per-packet one-way delay: 295.608 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 5.54 Mbit/s
95th percentile per-packet one-way delay: 295.608 ms
Loss rate: 1.50%
```

Run 3: Report of TCP Cubic — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2018-01-25 20:06:19
End at: 2018-01-25 20:06:49
Local clock offset: -3.287 ms

# Below is generated by plot.py at 2018-01-26 00:18:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 236.715 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 236.715 ms
Loss rate: 0.88%
```
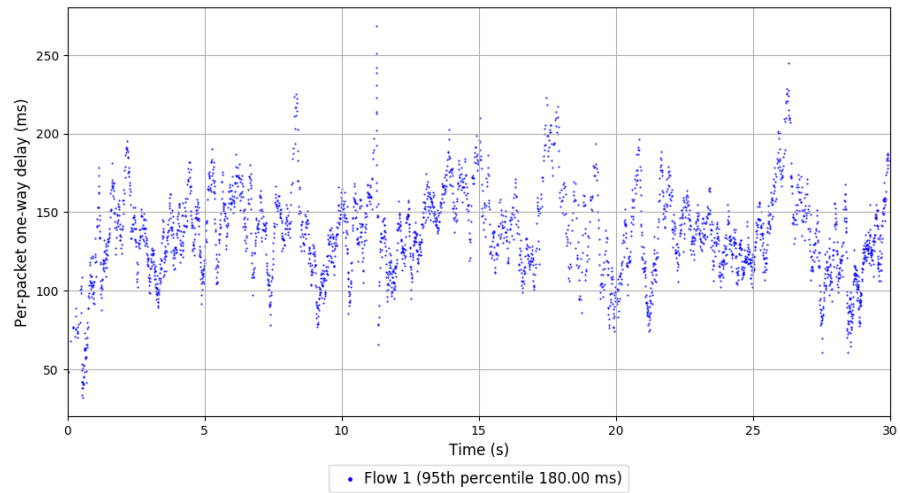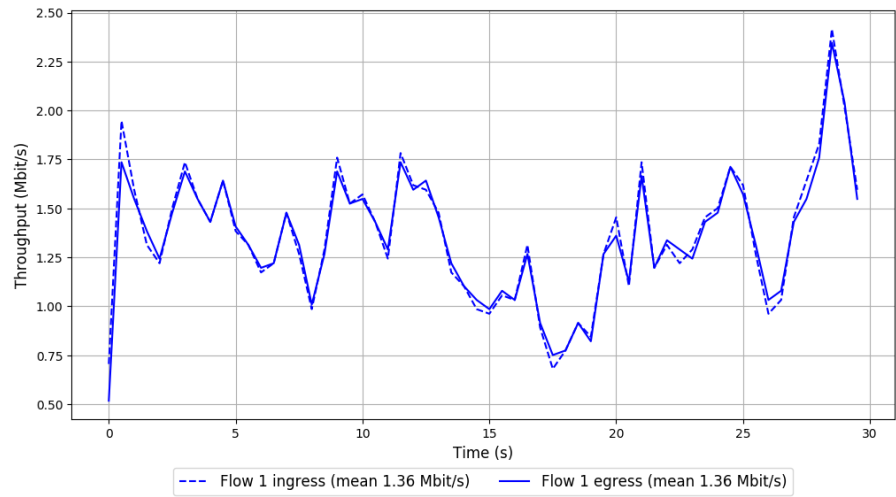
Run 1: Report of LEDBAT — Data Link

Flow 1 ingress (mean 1.52 Mbit/s)   Flow 1 egress (mean 1.51 Mbit/s)

Flow 1 (95th percentile 236.72 ms)

```
Run 2: Statistics of LEDBAT

Start at: 2018-01-25 20:53:00
End at: 2018-01-25 20:53:30
Local clock offset: -3.494 ms

# Below is generated by plot.py at 2018-01-26 00:18:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 180.004 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 180.004 ms
Loss rate: 0.69%
```
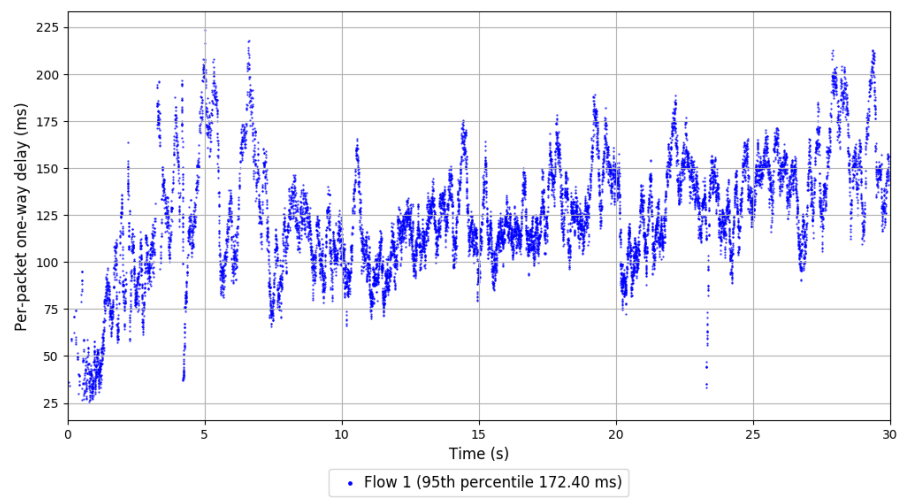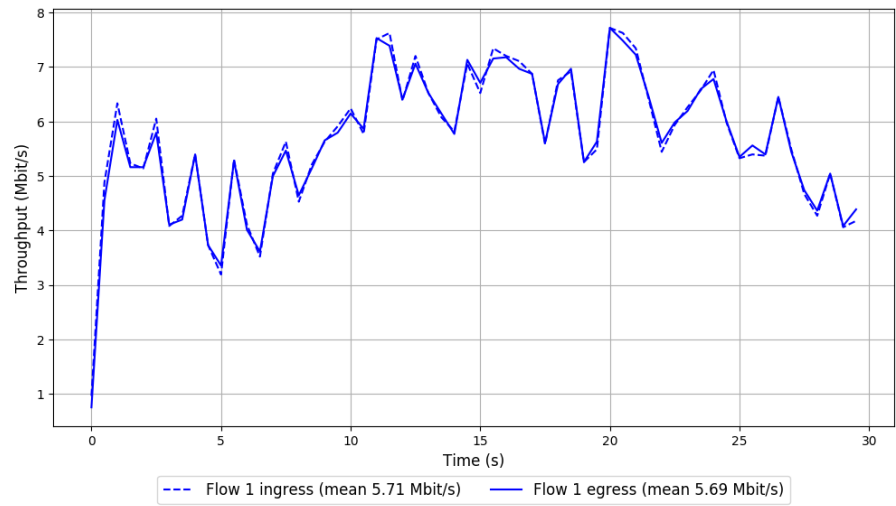
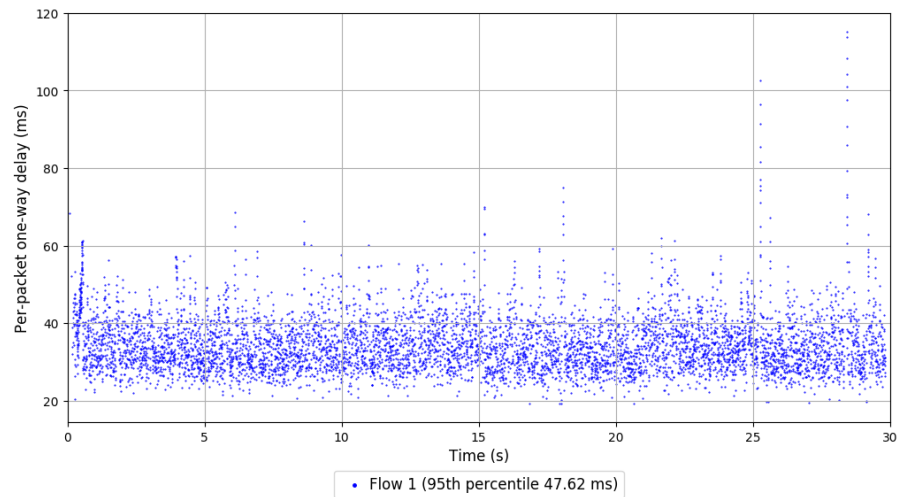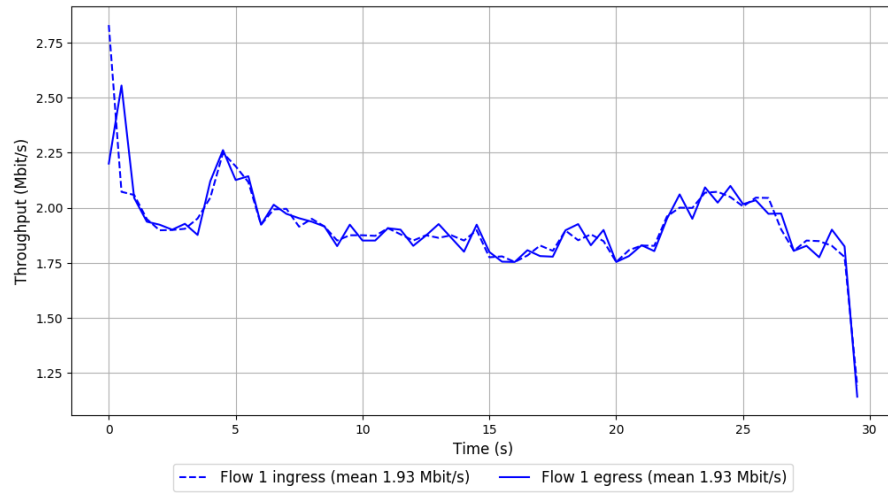Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 1.36 Mbit/s)   Flow 1 egress (mean 1.36 Mbit/s)

Flow 1 (95th percentile 180.00 ms)

```
Run 3: Statistics of LEDBAT

Start at: 2018-01-25 21:39:42
End at: 2018-01-25 21:40:12
Local clock offset: -3.541 ms

# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.69 Mbit/s
95th percentile per-packet one-way delay: 172.397 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 5.69 Mbit/s
95th percentile per-packet one-way delay: 172.397 ms
Loss rate: 0.35%
```
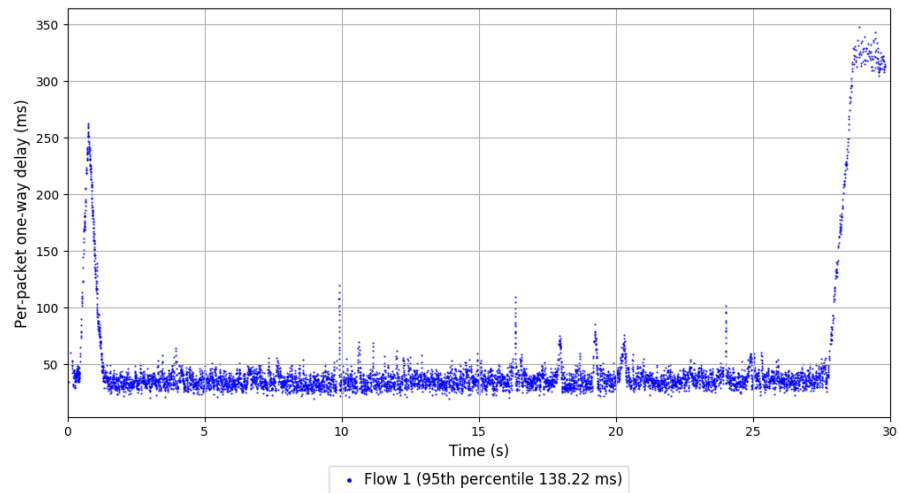
Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 5.71 Mbit/s) ——— Flow 1 egress (mean 5.69 Mbit/s)

• Flow 1 (95th percentile 172.40 ms)

```
Run 1: Statistics of PCC

Start at: 2018-01-25 19:40:03
End at: 2018-01-25 19:40:33
Local clock offset: -3.596 ms

# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 47.615 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 47.615 ms
Loss rate: 0.13%
```
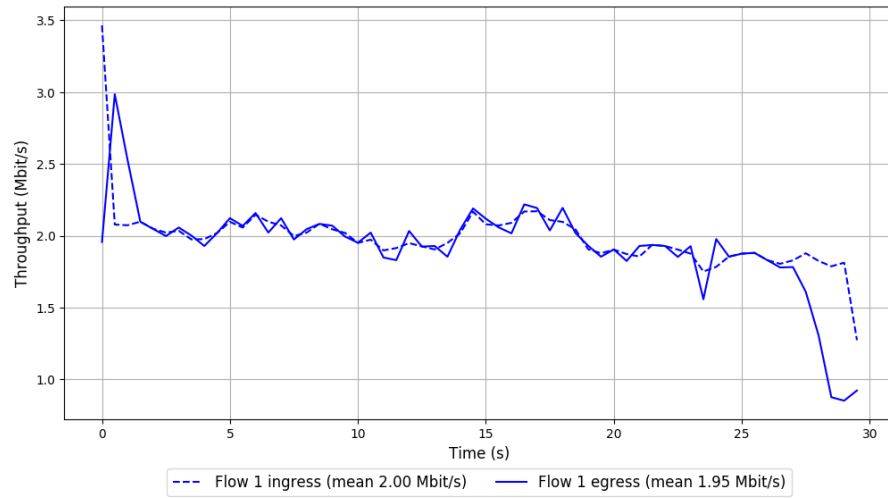
Run 1: Report of PCC — Data Link

```
Run 2: Statistics of PCC

Start at: 2018-01-25 20:26:44
End at: 2018-01-25 20:27:14
Local clock offset: -3.415 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 138.225 ms
Loss rate: 2.69%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 138.225 ms
Loss rate: 2.69%
```
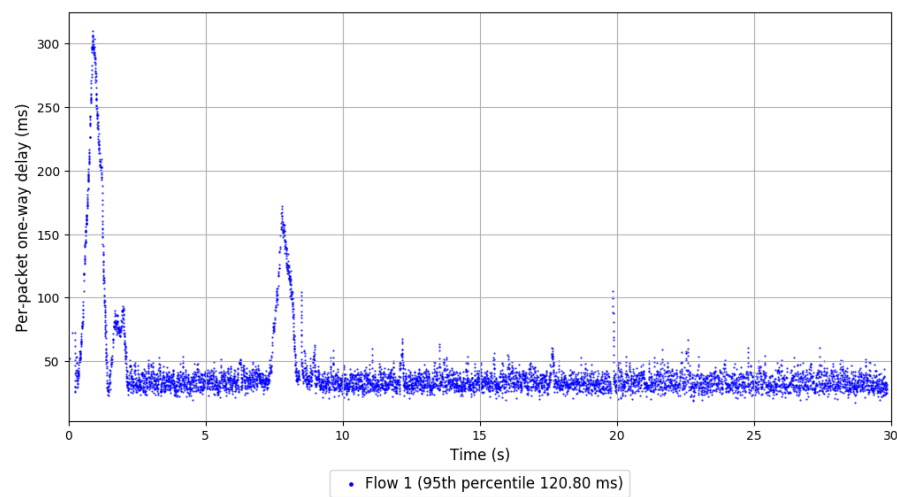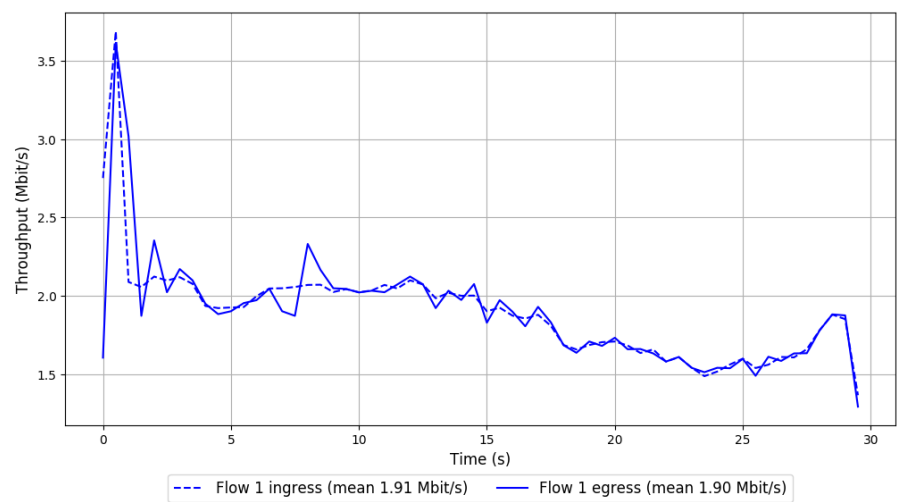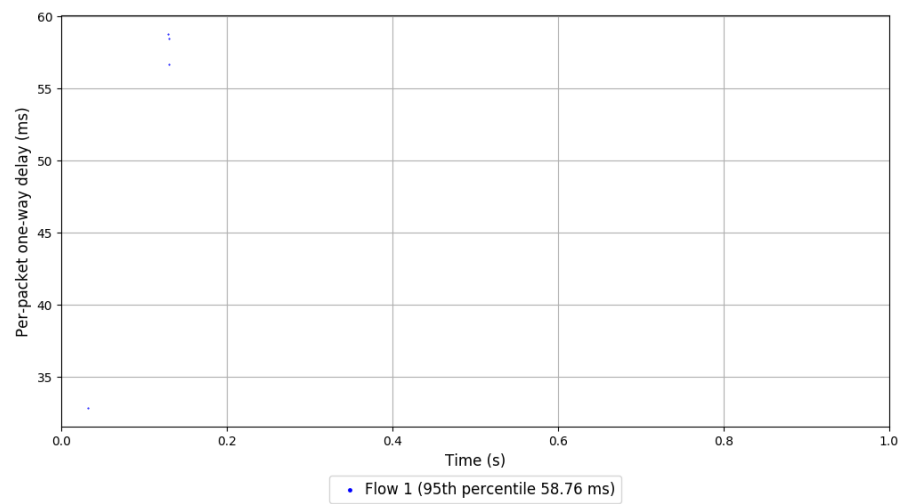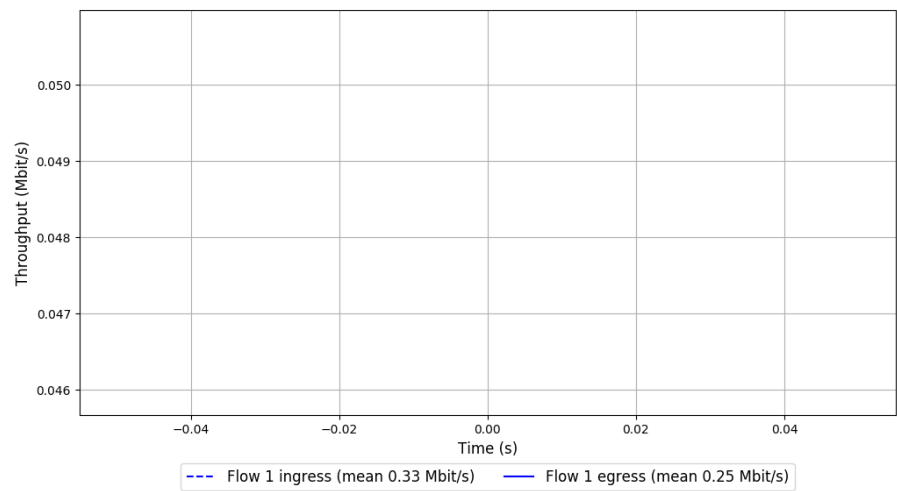
Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 2.00 Mbit/s)   Flow 1 egress (mean 1.95 Mbit/s)

Flow 1 (95th percentile 138.22 ms)

```
Run 3: Statistics of PCC

Start at: 2018-01-25 21:13:26
End at: 2018-01-25 21:13:56
Local clock offset: -3.37 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 120.802 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 120.802 ms
Loss rate: 0.26%
```

Run 3: Report of PCC — Data Link

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-01-25 19:54:38
End at: 2018-01-25 19:55:08
Local clock offset: -3.253 ms
```

Run 1: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.33 Mbit/s) --- Flow 1 egress (mean 0.25 Mbit/s)
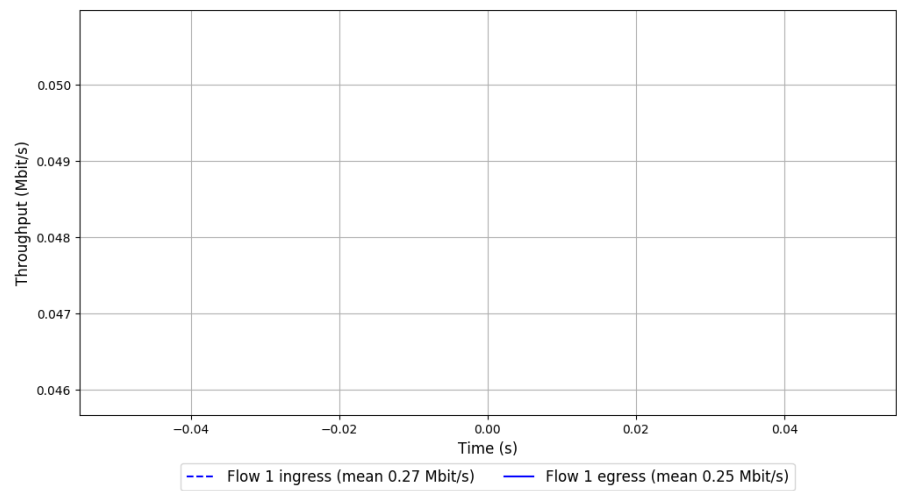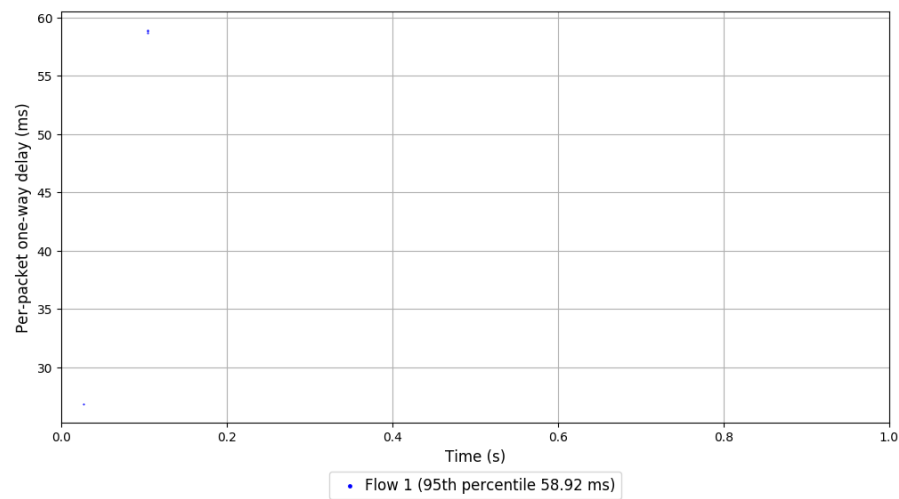

• Flow 1 (95th percentile 58.76 ms)

Run 2: Statistics of QUIC Cubic

Start at: 2018-01-25 20:41:20
End at: 2018-01-25 20:41:50
Local clock offset: -3.491 ms
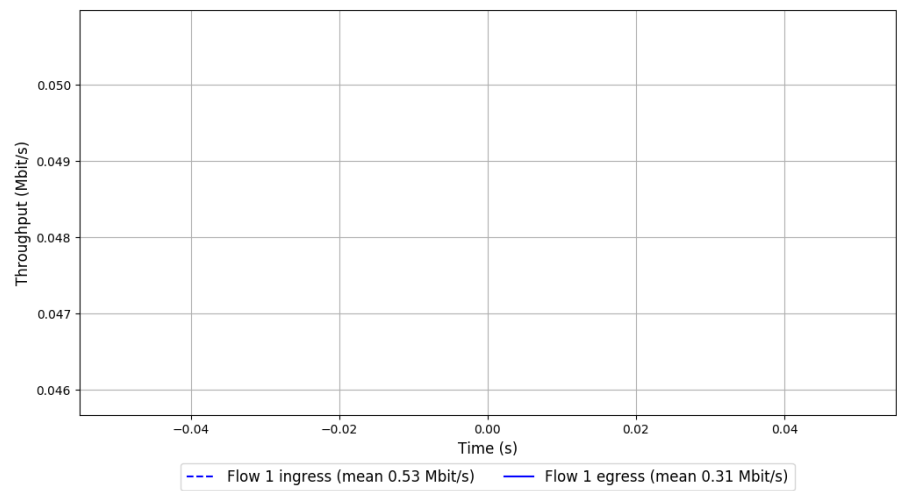
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.27 Mbit/s)   Flow 1 egress (mean 0.25 Mbit/s)

• Flow 1 (95th percentile 75.11 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-01-25 21:28:01
End at: 2018-01-25 21:28:31
Local clock offset: -3.536 ms
```
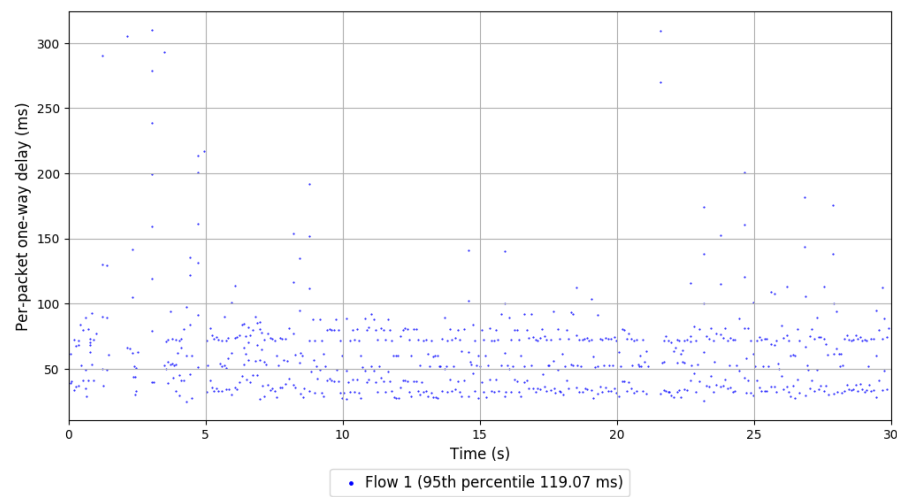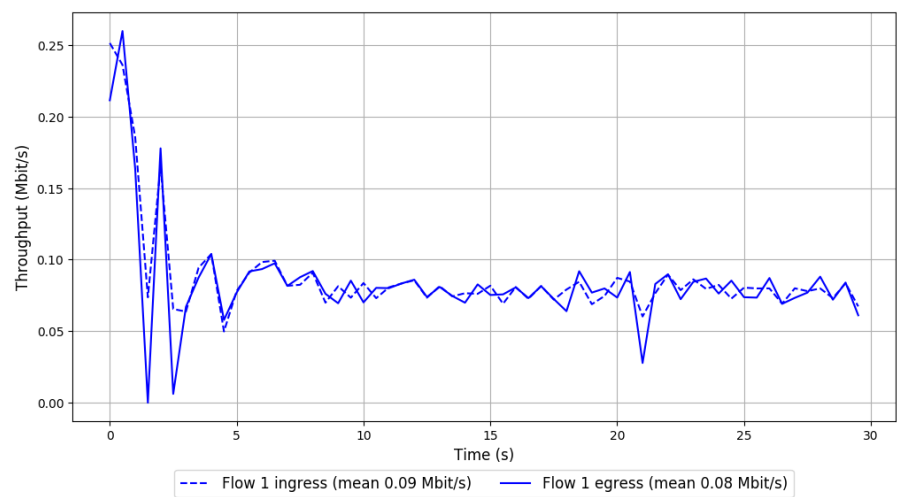
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.53 Mbit/s)   Flow 1 egress (mean 0.31 Mbit/s)

Flow 1 (95th percentile 58.92 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-01-25 19:42:58
End at: 2018-01-25 19:43:28
Local clock offset: -3.583 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 119.069 ms
Loss rate: 3.58%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 119.069 ms
Loss rate: 3.58%
```

Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-01-25 20:29:40
End at: 2018-01-25 20:30:10
Local clock offset: -3.447 ms

# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 210.916 ms
Loss rate: 11.08%
-- Flow 1:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 210.916 ms
Loss rate: 11.08%
```
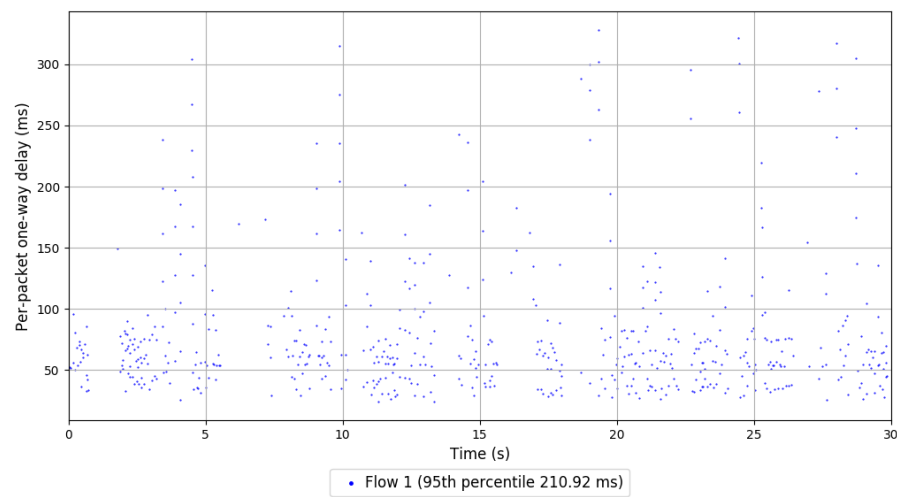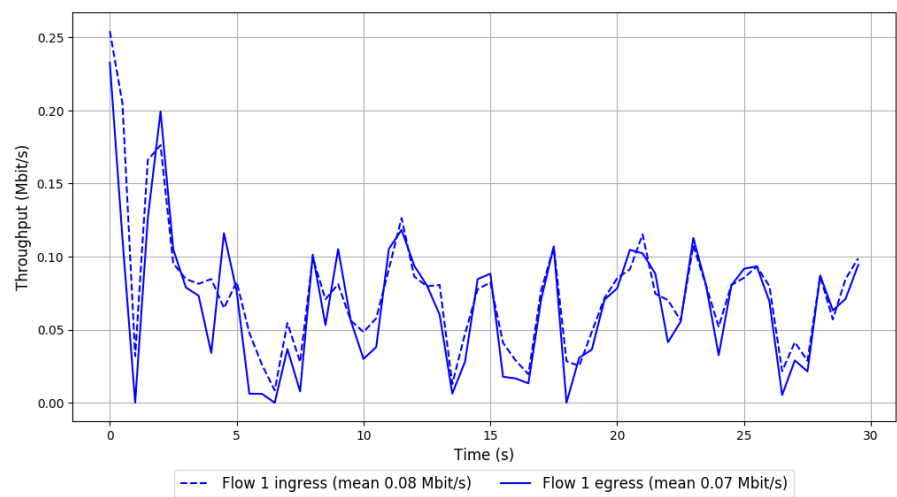
Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-01-25 21:16:21
End at: 2018-01-25 21:16:51
Local clock offset: -3.359 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 142.285 ms
Loss rate: 1.70%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 142.285 ms
Loss rate: 1.70%
```
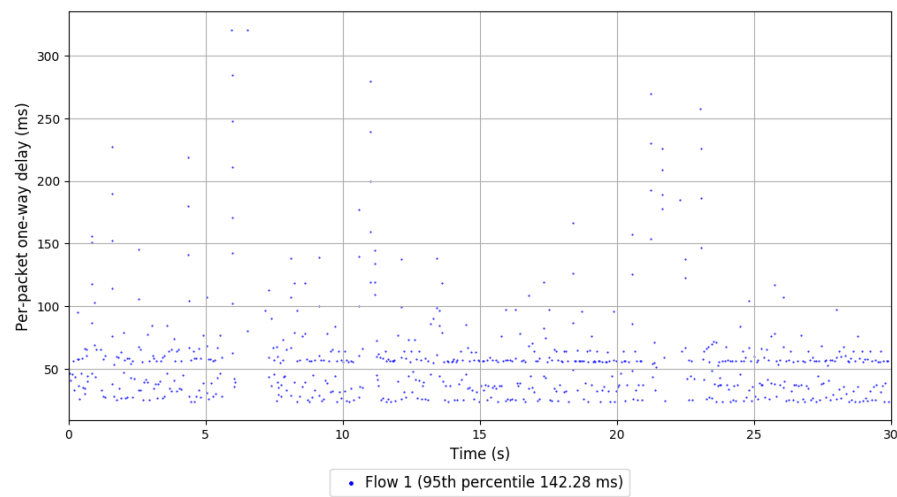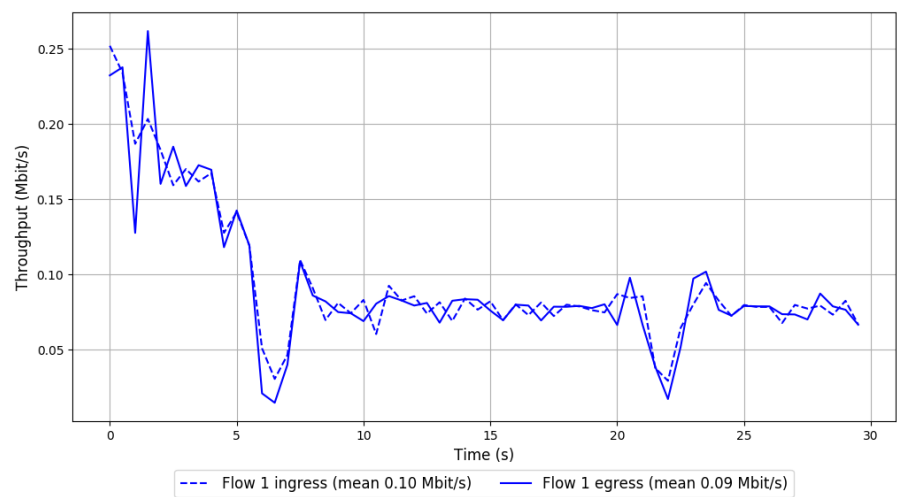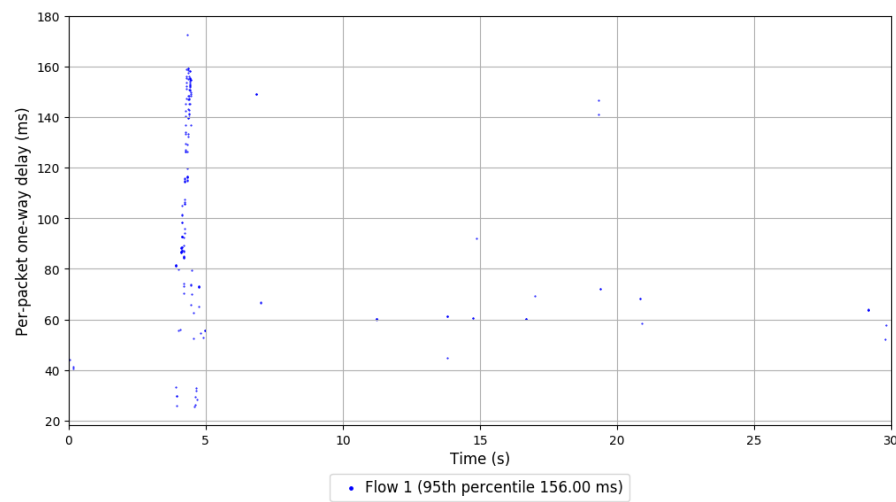
Run 3: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.10 Mbit/s) — Flow 1 egress (mean 0.09 Mbit/s)

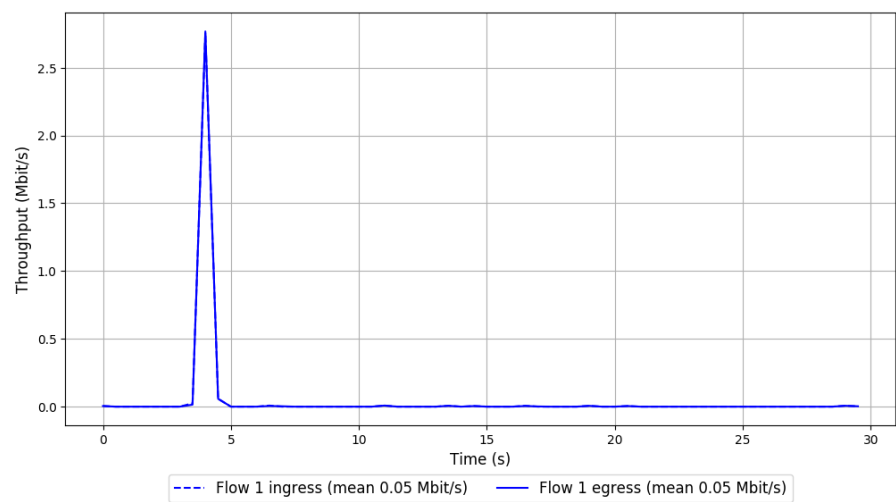Flow 1 (95th percentile 142.28 ms)

```
Run 1: Statistics of WebRTC media

Start at: 2018-01-25 19:48:48
End at: 2018-01-25 19:49:19
Local clock offset: -3.361 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 155.998 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 155.998 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-01-25 20:35:30
End at: 2018-01-25 20:36:00
Local clock offset: -3.476 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 310.427 ms
Loss rate: 4.73%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 310.427 ms
Loss rate: 4.73%
```
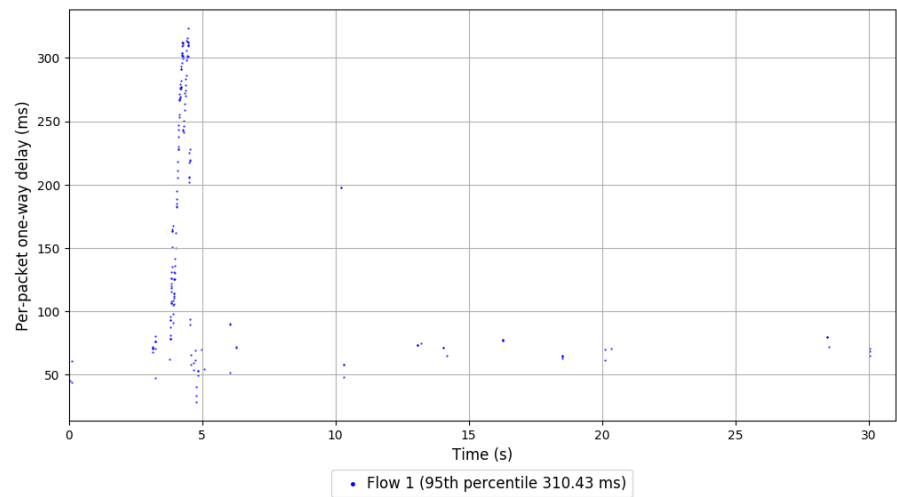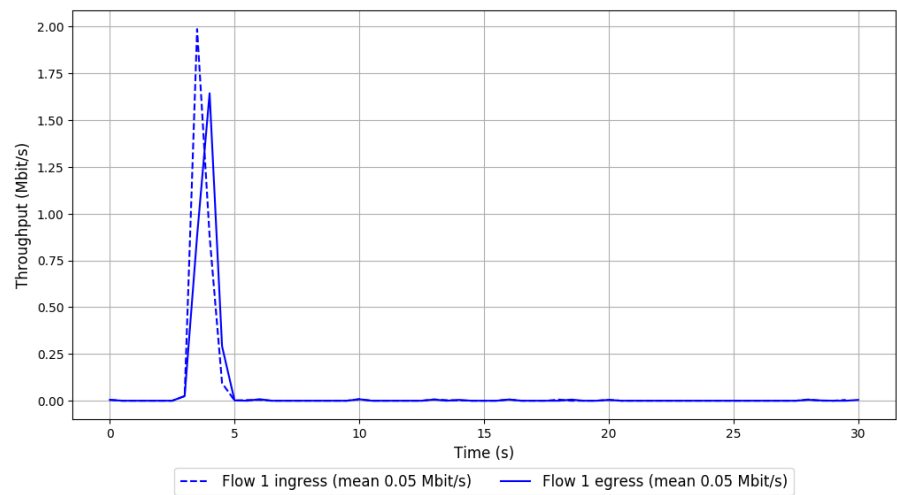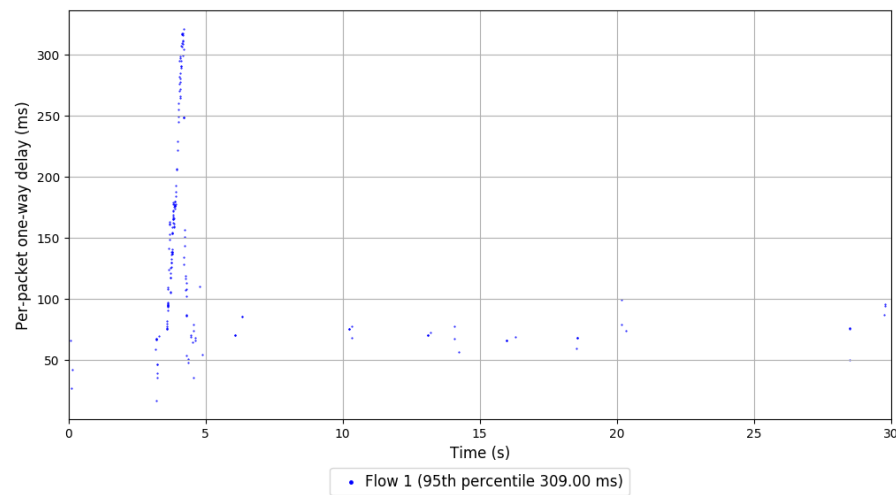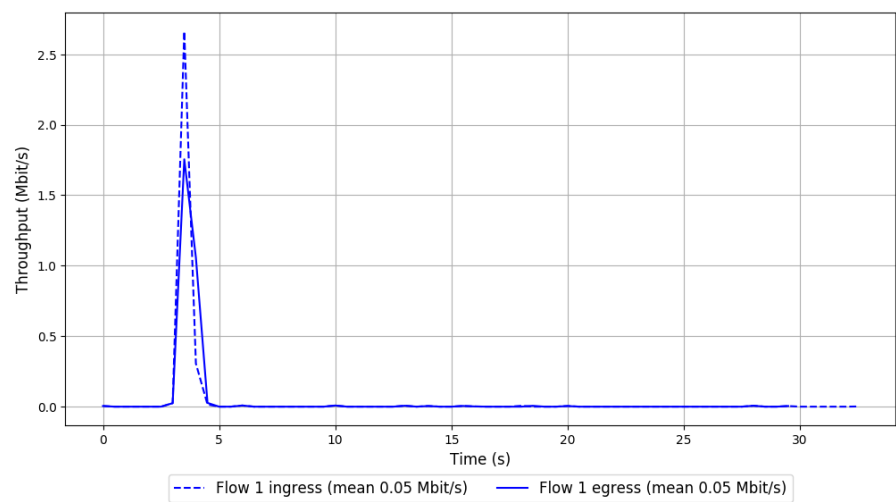
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-01-25 21:22:11
End at: 2018-01-25 21:22:42
Local clock offset: -3.433 ms

# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 309.000 ms
Loss rate: 4.74%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 309.000 ms
Loss rate: 4.74%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.05 Mbit/s)   Flow 1 egress (mean 0.05 Mbit/s)
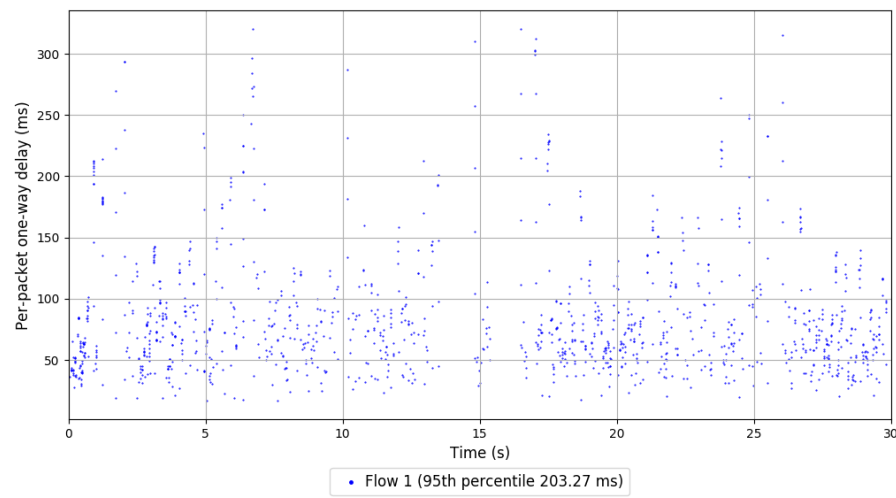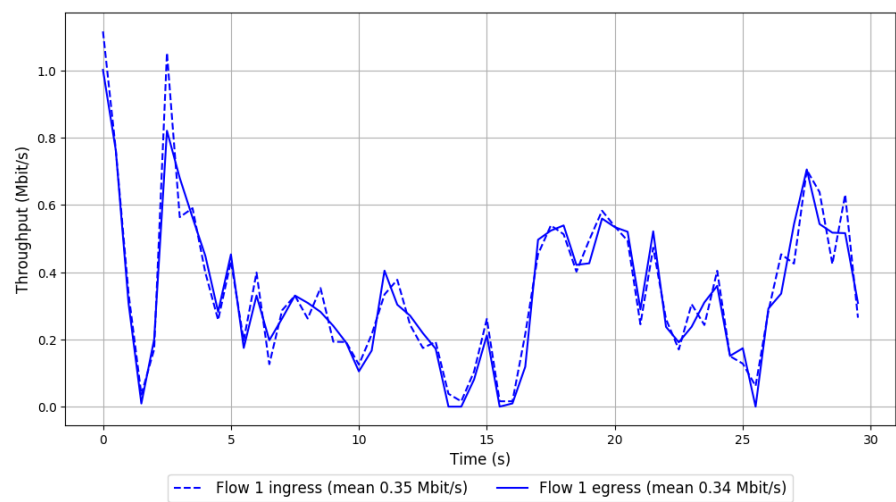

Flow 1 (95th percentile 309.00 ms)

```
Run 1: Statistics of Sprout

Start at: 2018-01-25 19:51:43
End at: 2018-01-25 19:52:13
Local clock offset: -3.28 ms


# Below is generated by plot.py at 2018-01-26 00:18:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 203.266 ms
Loss rate: 2.45%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 203.266 ms
Loss rate: 2.45%
```

Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-01-25 20:38:25
End at: 2018-01-25 20:38:55
Local clock offset: -3.487 ms

# Below is generated by plot.py at 2018-01-26 00:18:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 132.974 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 132.974 ms
Loss rate: 0.66%
```
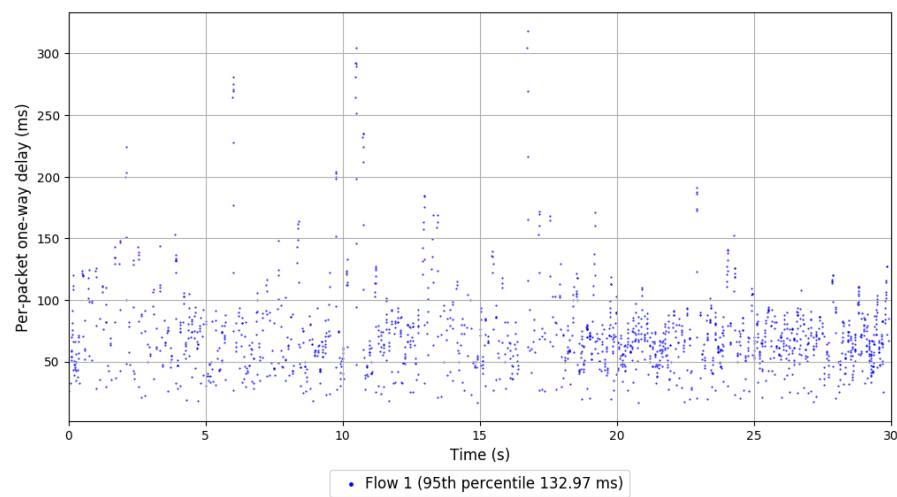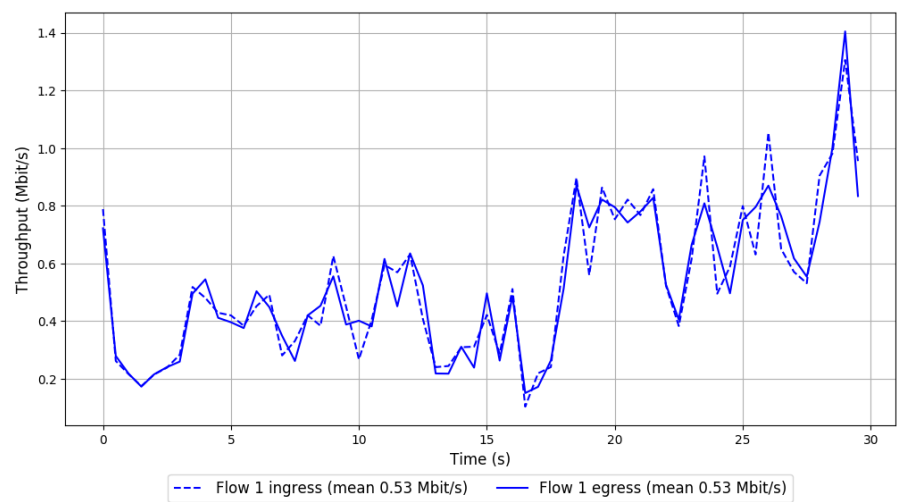
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-01-25 21:25:07
End at: 2018-01-25 21:25:37
Local clock offset: -3.479 ms


# Below is generated by plot.py at 2018-01-26 00:18:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 180.722 ms
Loss rate: 0.98%
-- Flow 1:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 180.722 ms
Loss rate: 0.98%
```
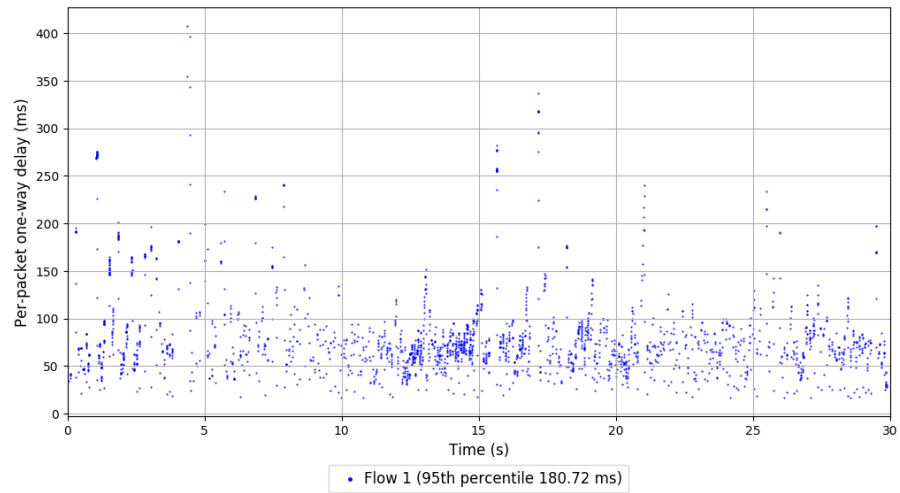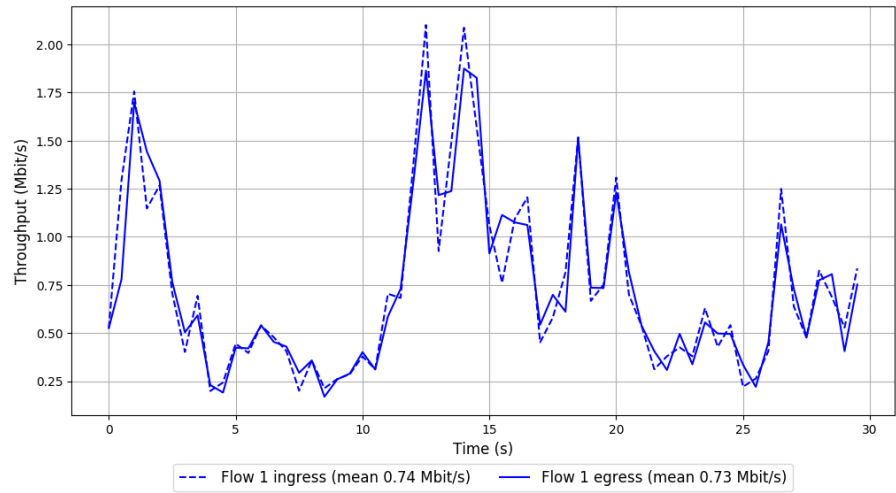
Run 3: Report of Sprout — Data Link

Flow 1 ingress (mean 0.74 Mbit/s)   Flow 1 egress (mean 0.73 Mbit/s)
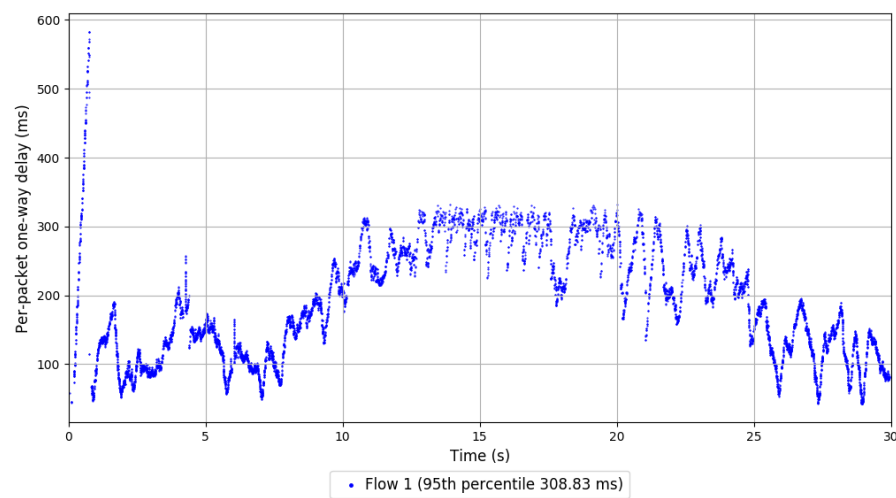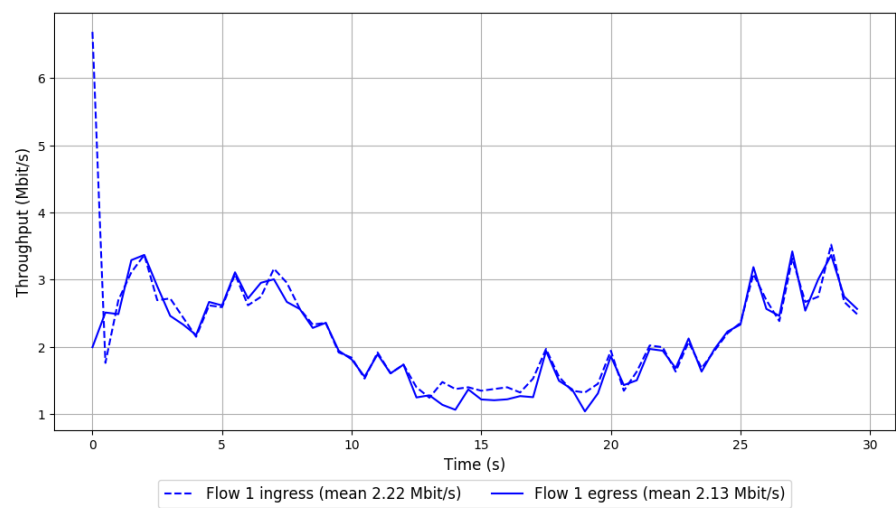

Flow 1 (95th percentile 180.72 ms)

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

Start at: 2018-01-25 19:45:53
End at: 2018-01-25 19:46:23
Local clock offset: -3.383 ms

# Below is generated by plot.py at 2018-01-26 00:18:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 308.830 ms
Loss rate: 4.61%
-- Flow 1:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 308.830 ms
Loss rate: 4.61%
```
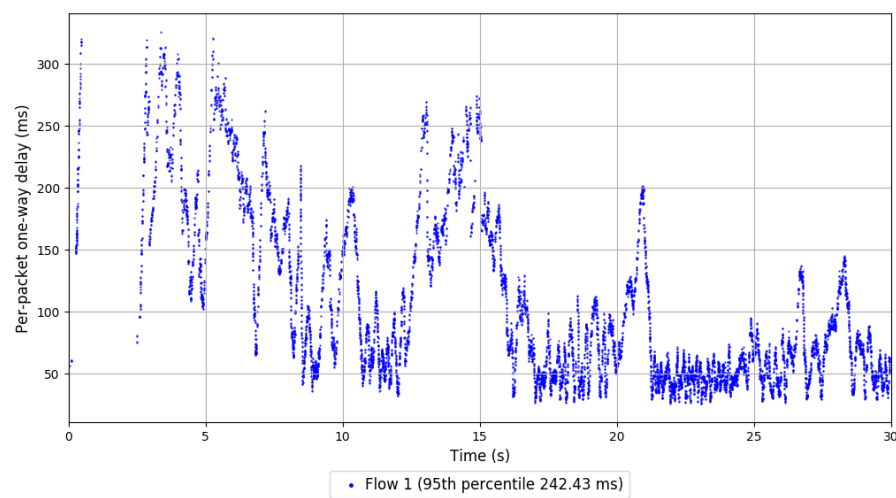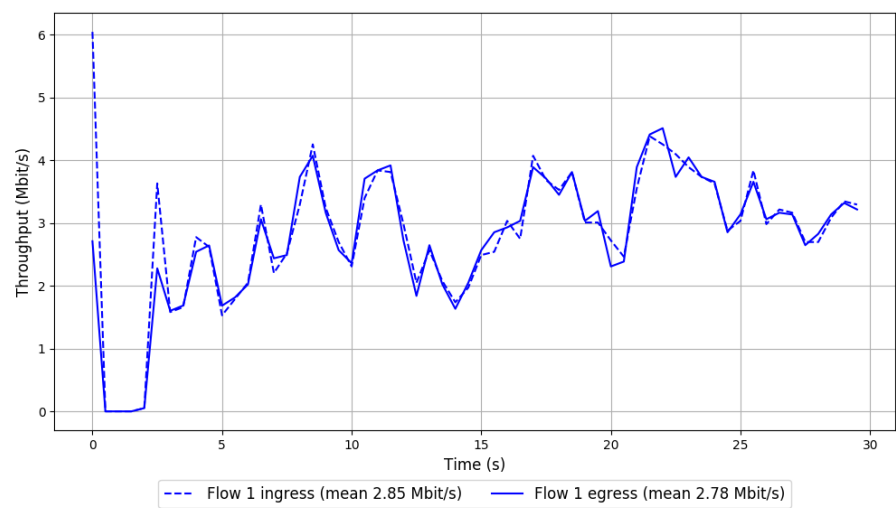
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 2.22 Mbit/s) --- Flow 1 egress (mean 2.13 Mbit/s)

• Flow 1 (95th percentile 308.83 ms)

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

Start at: 2018-01-25 20:32:34
End at: 2018-01-25 20:33:04
Local clock offset: -3.535 ms

# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 242.430 ms
Loss rate: 2.49%
-- Flow 1:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 242.430 ms
Loss rate: 2.49%
```
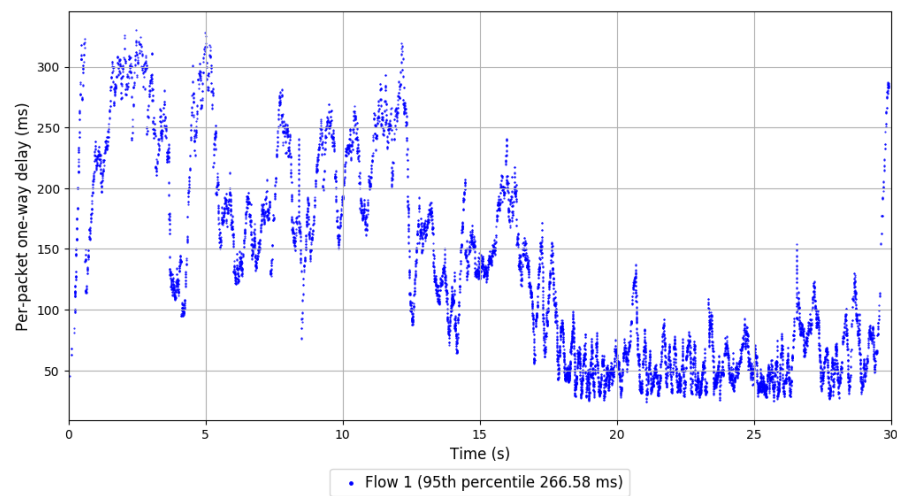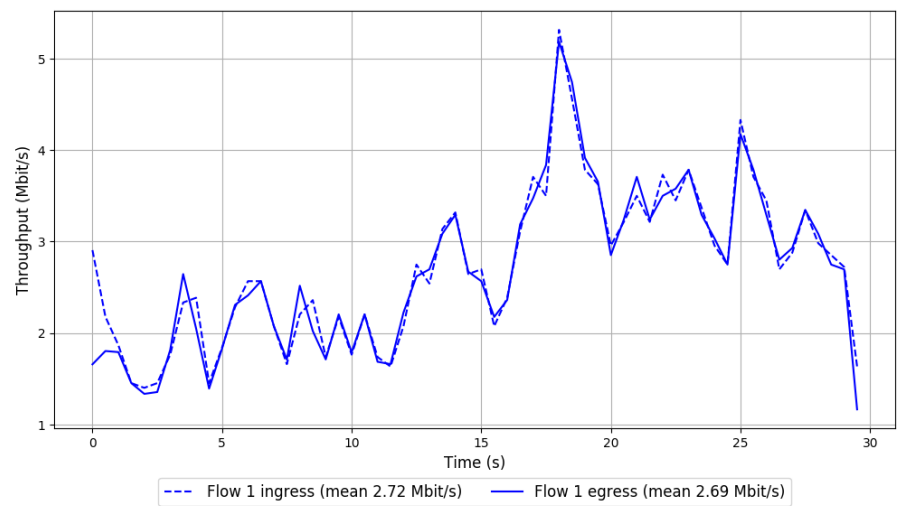
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 2.85 Mbit/s)   Flow 1 egress (mean 2.78 Mbit/s)

• Flow 1 (95th percentile 242.43 ms)

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

Start at: 2018-01-25 21:19:16
End at: 2018-01-25 21:19:46
Local clock offset: -3.468 ms

# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 266.582 ms
Loss rate: 1.27%
-- Flow 1:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 266.582 ms
Loss rate: 1.27%
```

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

```
Run 1: Statistics of TCP Vegas

Start at: 2018-01-25 20:03:24
End at: 2018-01-25 20:03:54
Local clock offset: -3.274 ms


# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 167.669 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 167.669 ms
Loss rate: 0.84%
```
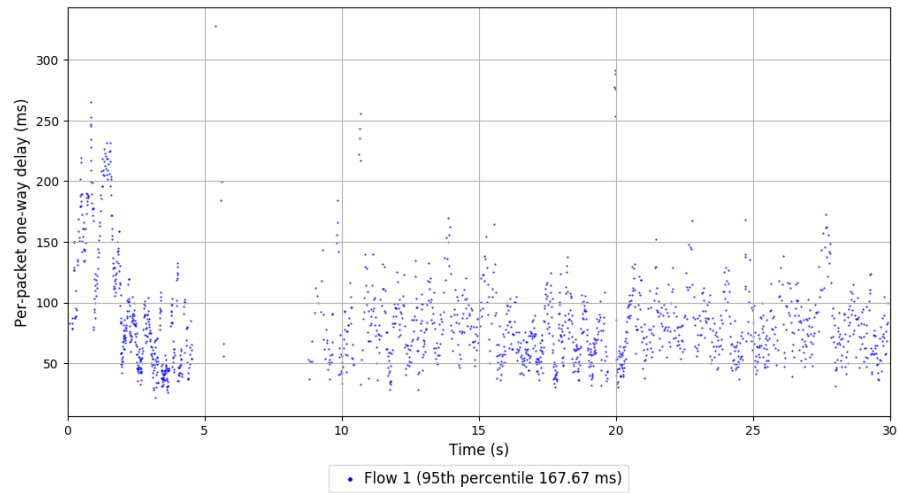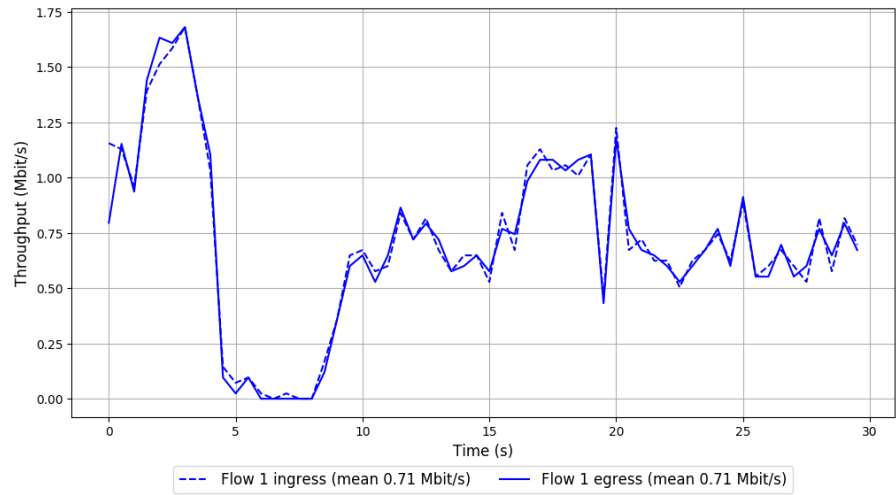
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-01-25 20:50:05
End at: 2018-01-25 20:50:35
Local clock offset: -3.589 ms


# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 303.640 ms
Loss rate: 3.94%
-- Flow 1:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 303.640 ms
Loss rate: 3.94%
```
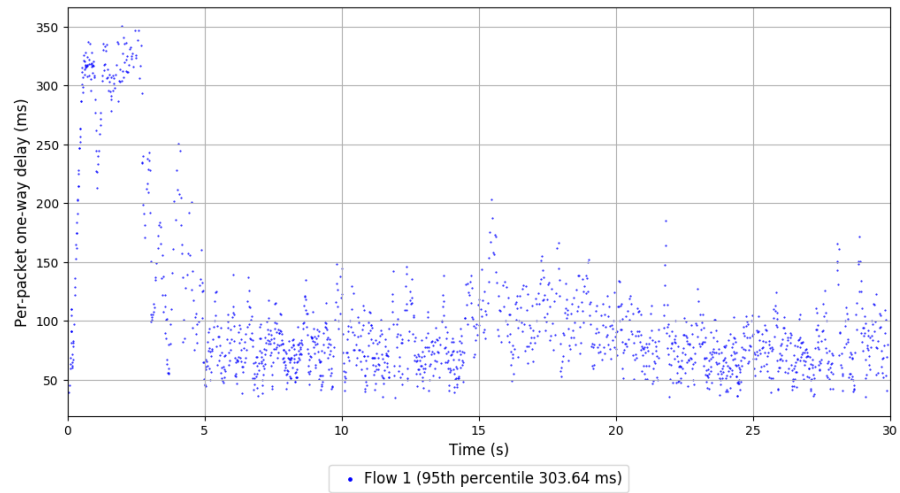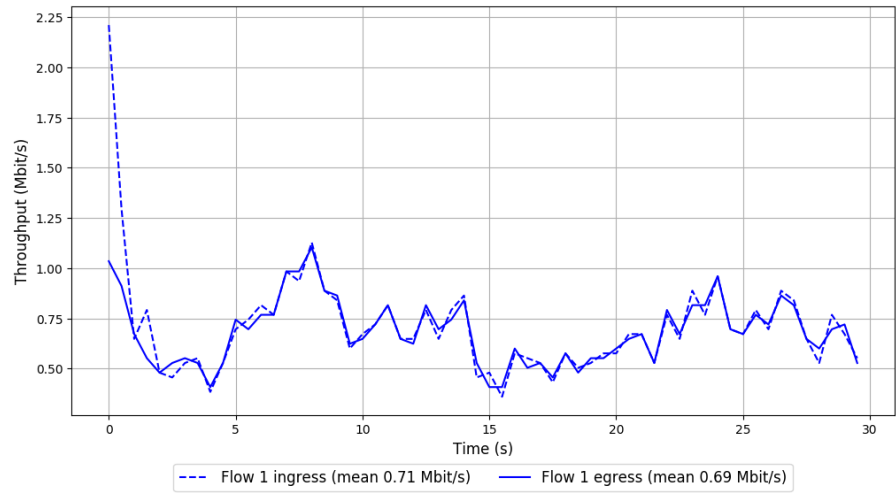
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-01-25 21:36:47
End at: 2018-01-25 21:37:17
Local clock offset: -3.597 ms


# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 215.017 ms
Loss rate: 1.18%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 215.017 ms
Loss rate: 1.18%
```
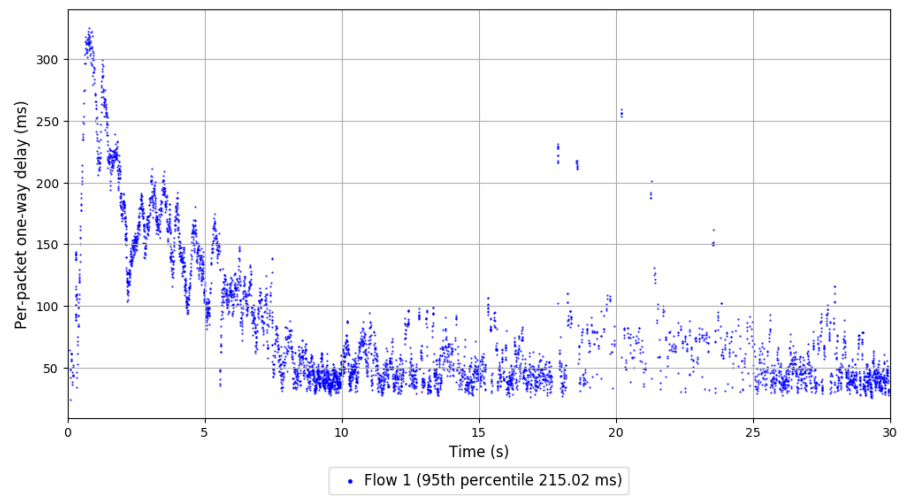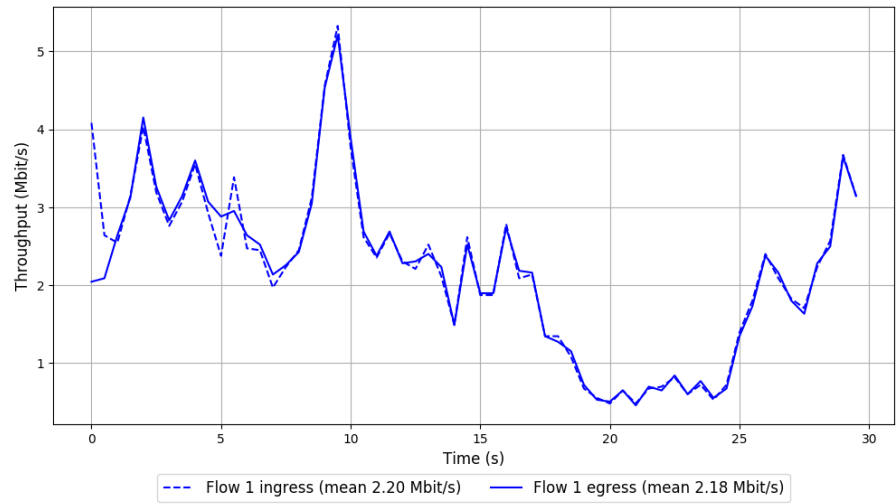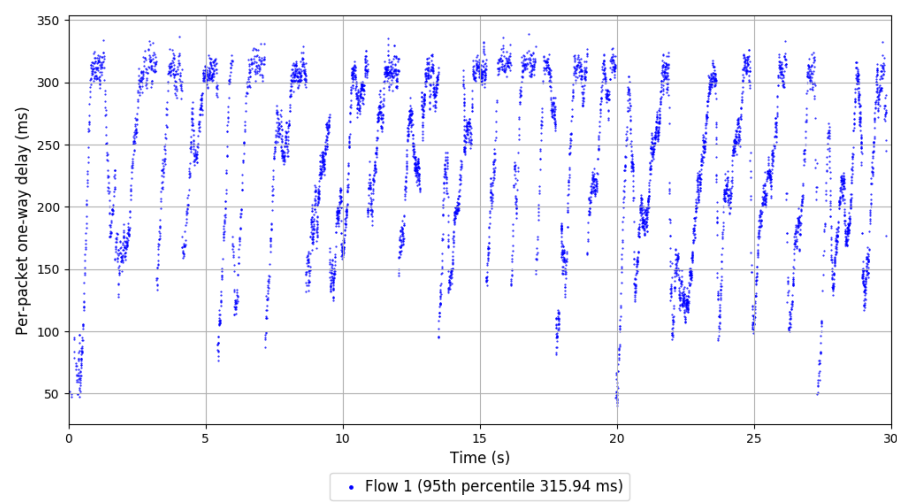
Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 2.20 Mbit/s) --- Flow 1 egress (mean 2.18 Mbit/s) ——

• Flow 1 (95th percentile 215.02 ms)

```
Run 1: Statistics of Verus

Start at: 2018-01-25 20:09:14
End at: 2018-01-25 20:09:44
Local clock offset: -3.302 ms

# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.72 Mbit/s
95th percentile per-packet one-way delay: 315.935 ms
Loss rate: 11.16%
-- Flow 1:
Average throughput: 2.72 Mbit/s
95th percentile per-packet one-way delay: 315.935 ms
Loss rate: 11.16%
```
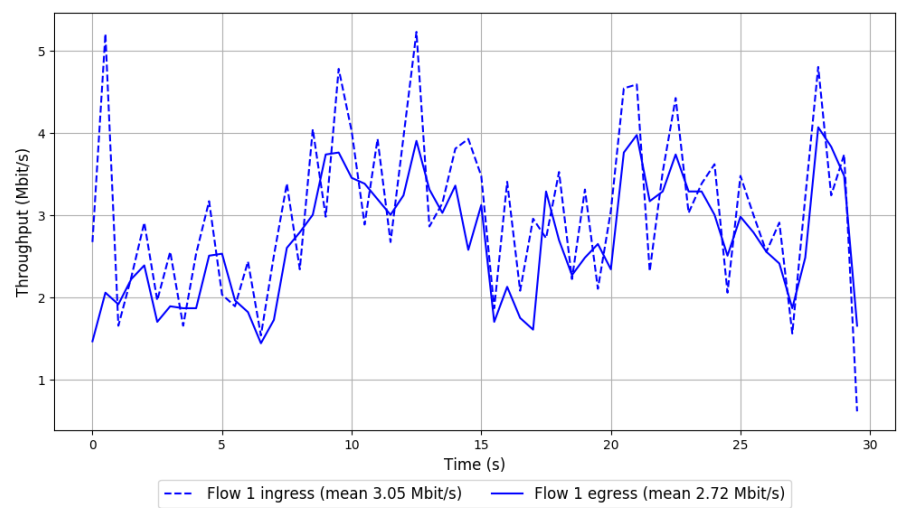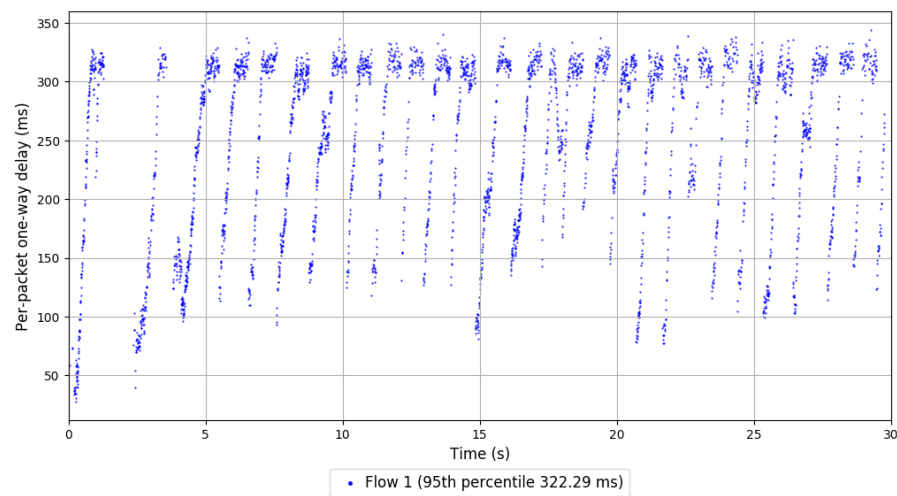
Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 3.05 Mbit/s) — — — Flow 1 egress (mean 2.72 Mbit/s)

• Flow 1 (95th percentile 315.94 ms)

```
Run 2: Statistics of Verus

Start at: 2018-01-25 20:55:55
End at: 2018-01-25 20:56:25
Local clock offset: -3.45 ms

# Below is generated by plot.py at 2018-01-26 00:18:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 322.287 ms
Loss rate: 20.52%
-- Flow 1:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 322.287 ms
Loss rate: 20.52%
```
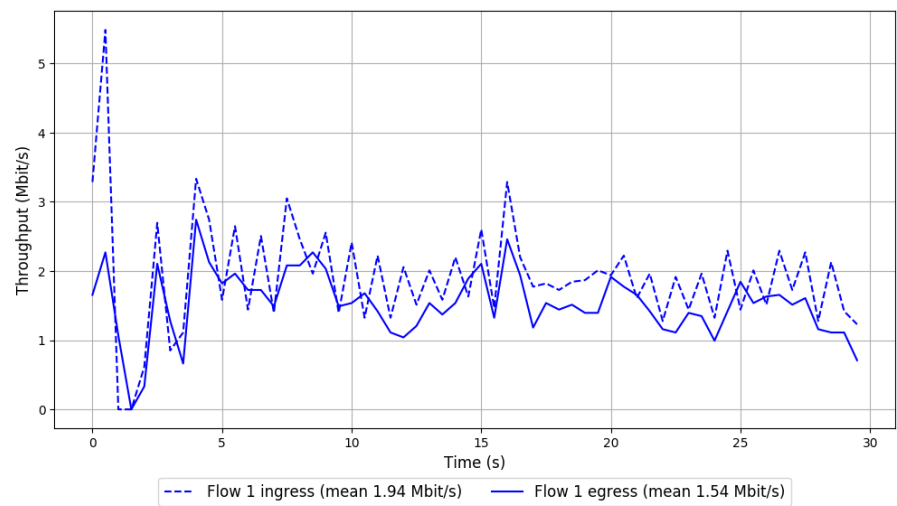
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-01-25 21:42:37
End at: 2018-01-25 21:43:07
Local clock offset: -3.645 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.14 Mbit/s
95th percentile per-packet one-way delay: 271.972 ms
Loss rate: 3.86%
-- Flow 1:
Average throughput: 5.14 Mbit/s
95th percentile per-packet one-way delay: 271.972 ms
Loss rate: 3.86%
```
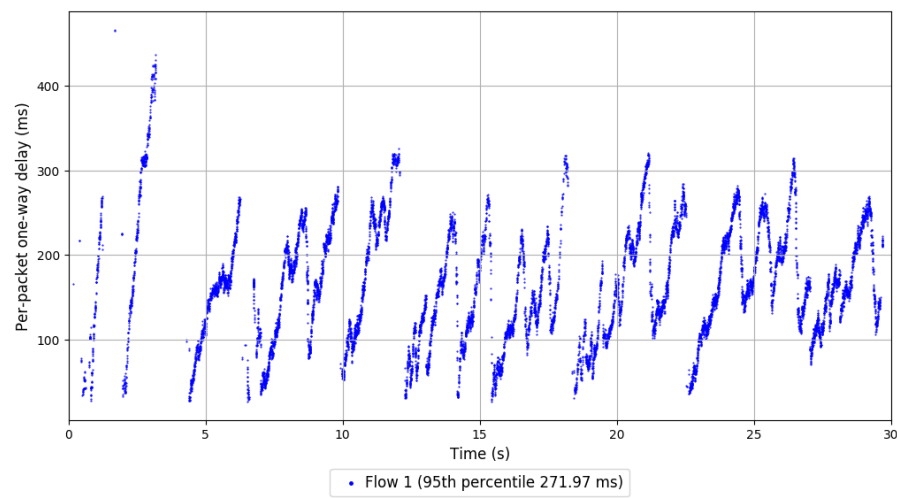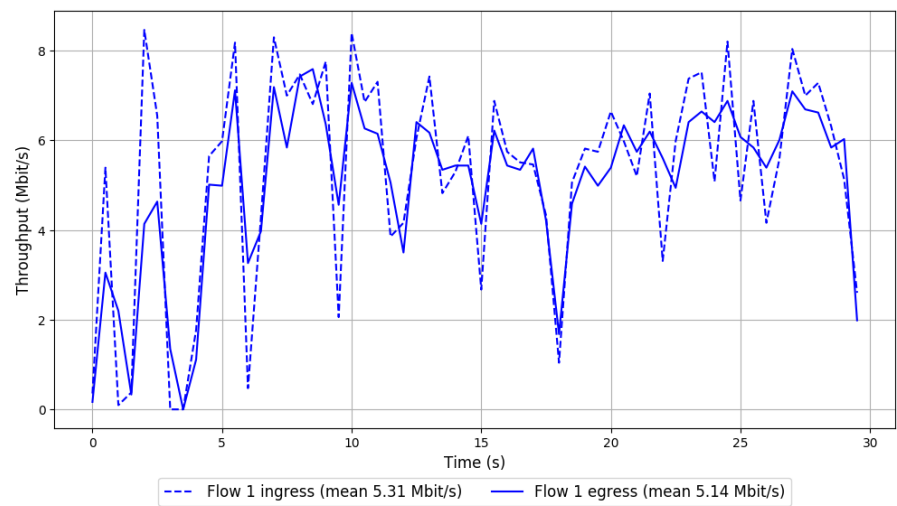
Run 3: Report of Verus — Data Link

```
Run 1: Statistics of Copa

Start at: 2018-01-25 20:20:54
End at: 2018-01-25 20:21:24
Local clock offset: -3.328 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 112.704 ms
Loss rate: 1.74%
-- Flow 1:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 112.704 ms
Loss rate: 1.74%
```
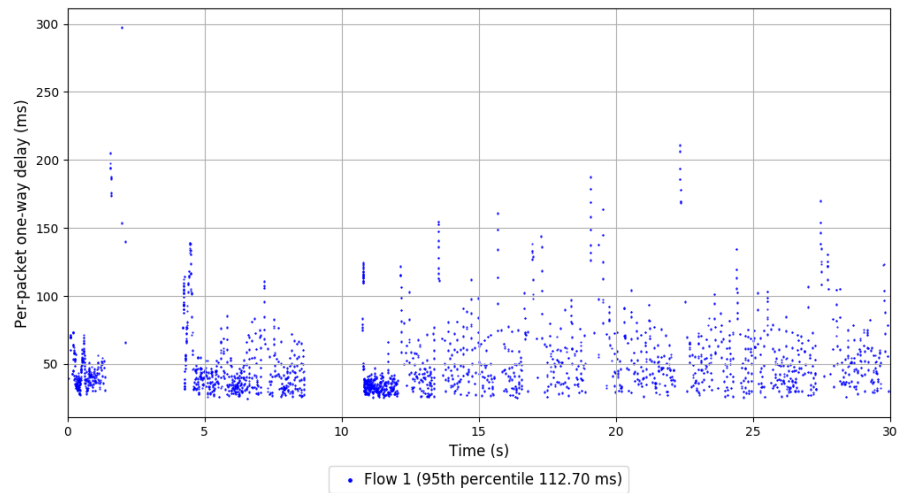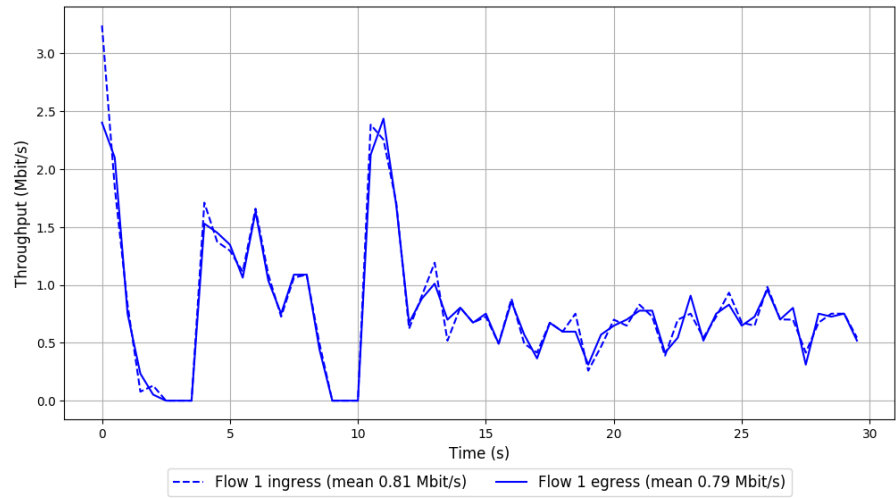
Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2018-01-25 21:07:36
End at: 2018-01-25 21:08:06
Local clock offset: -3.385 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 91.821 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 91.821 ms
Loss rate: 1.47%
```
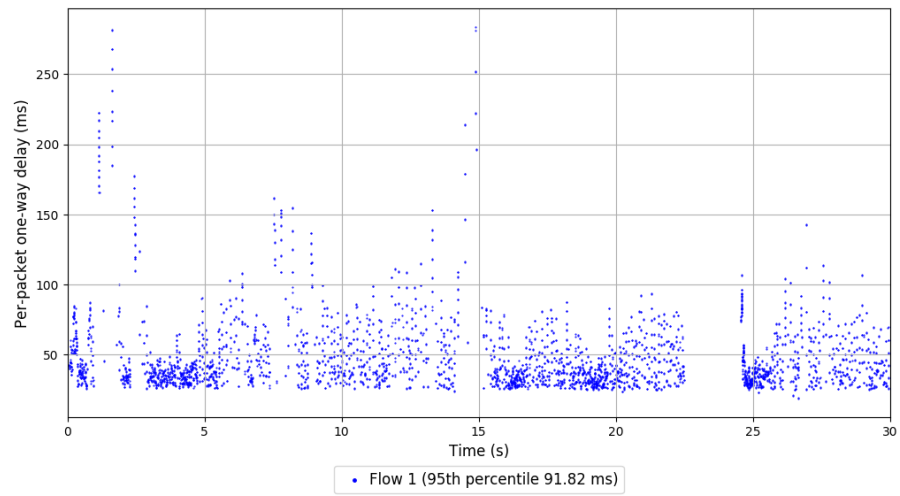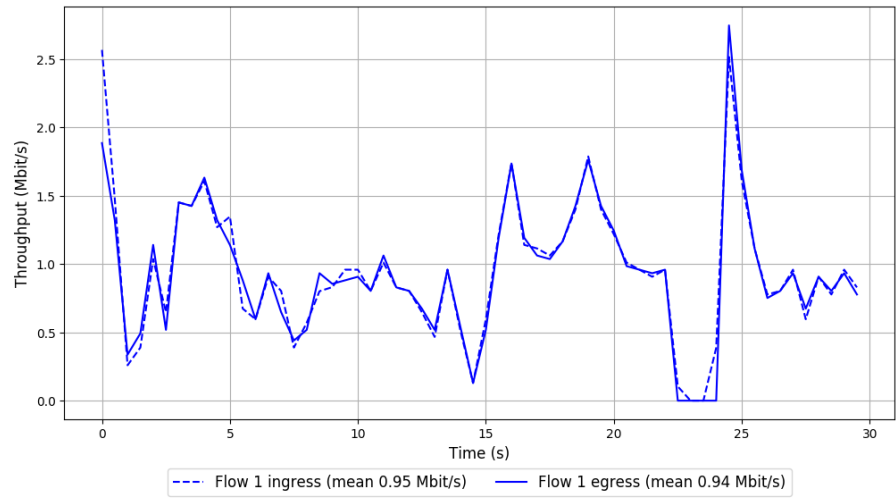
Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-01-25 21:54:18
End at: 2018-01-25 21:54:48
Local clock offset: -3.522 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 117.637 ms
Loss rate: 2.08%
-- Flow 1:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 117.637 ms
Loss rate: 2.08%
```
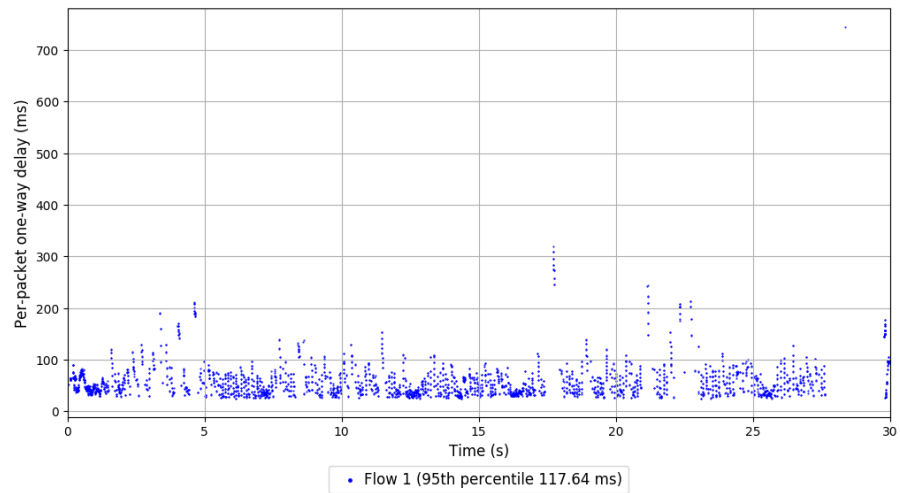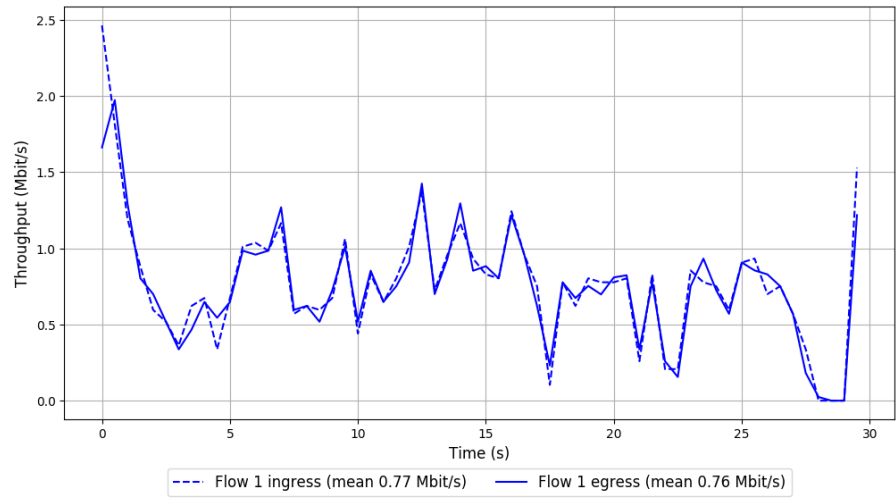
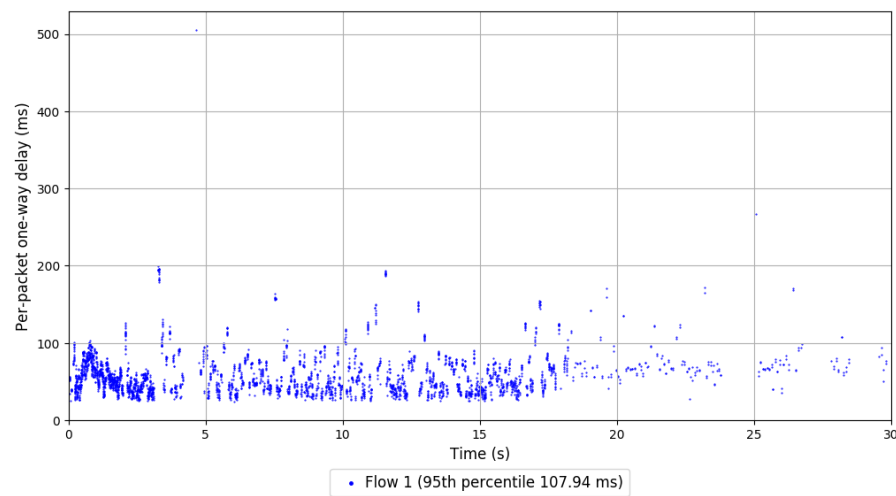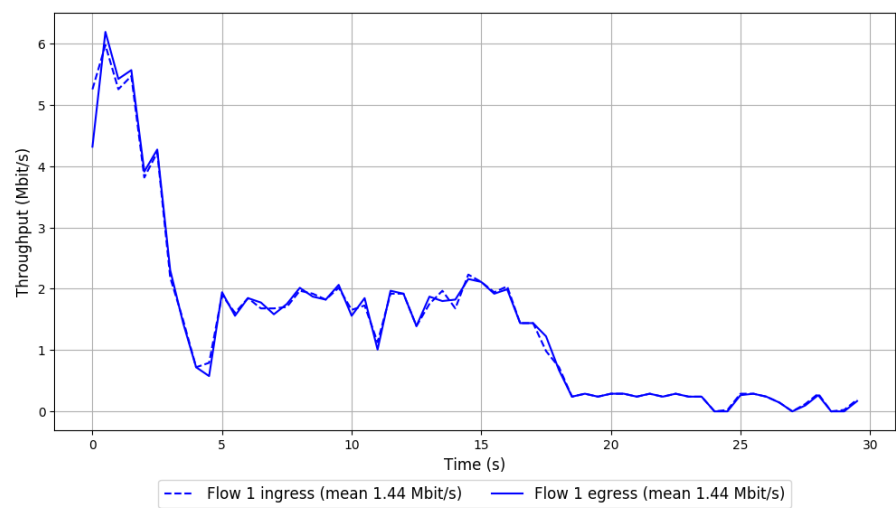Run 3: Report of Copa — Data Link

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

Start at: 2018-01-25 20:17:59
End at: 2018-01-25 20:18:29
Local clock offset: -3.306 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 107.940 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 107.940 ms
Loss rate: 0.48%
```

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

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

Start at: 2018-01-25 21:04:41
End at: 2018-01-25 21:05:11
Local clock offset: -3.429 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 91.816 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 91.816 ms
Loss rate: 0.35%
```
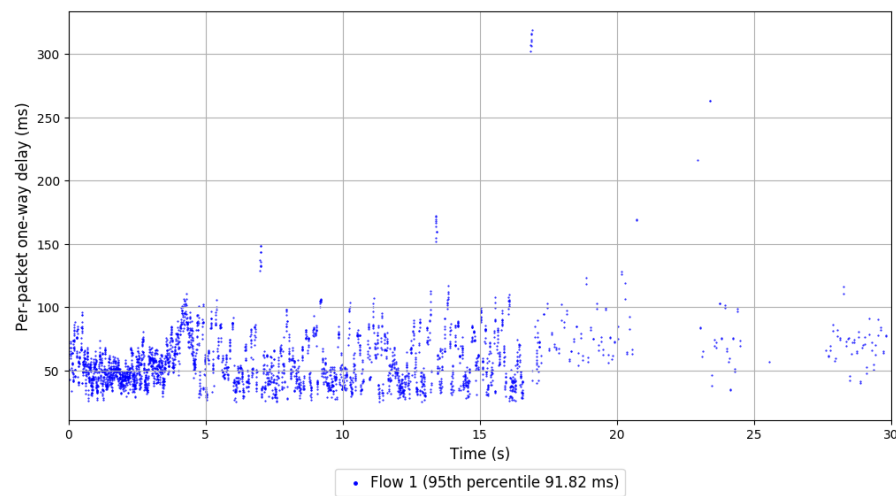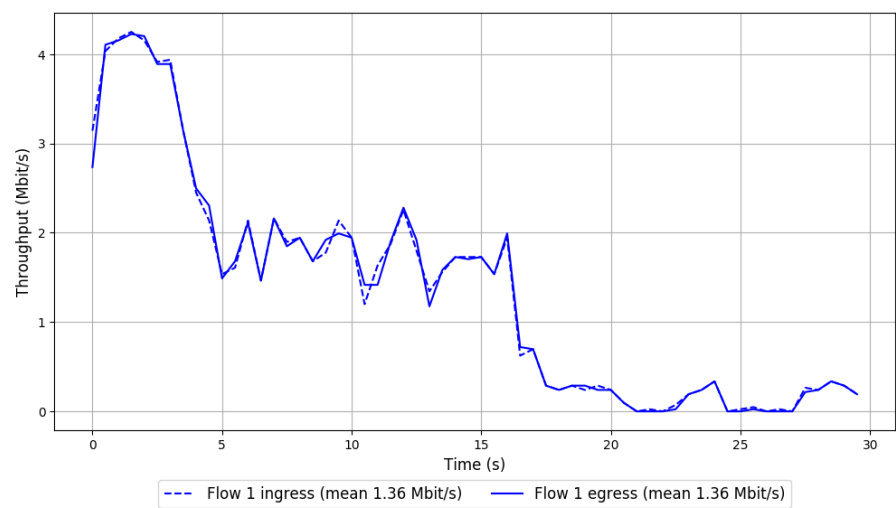
Run 2: Report of Indigo-2-256 — Data Link

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

Start at: 2018-01-25 21:51:23
End at: 2018-01-25 21:51:53
Local clock offset: -3.559 ms

# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 110.656 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 110.656 ms
Loss rate: 0.26%
```
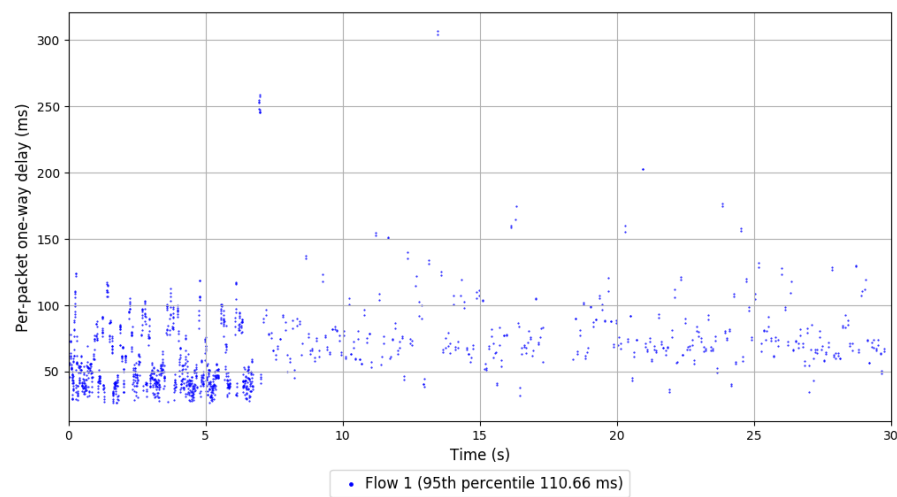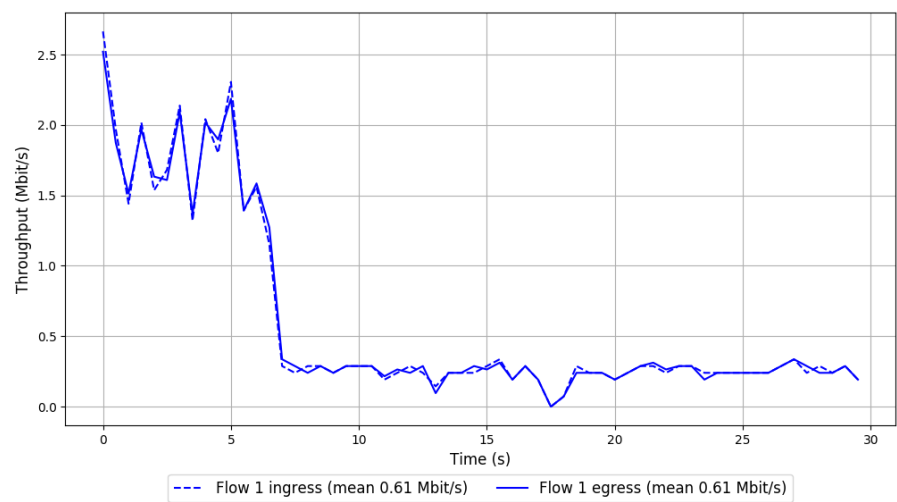
Run 3: Report of Indigo-2-256 — Data Link

Flow 1 ingress (mean 0.61 Mbit/s)   Flow 1 egress (mean 0.61 Mbit/s)
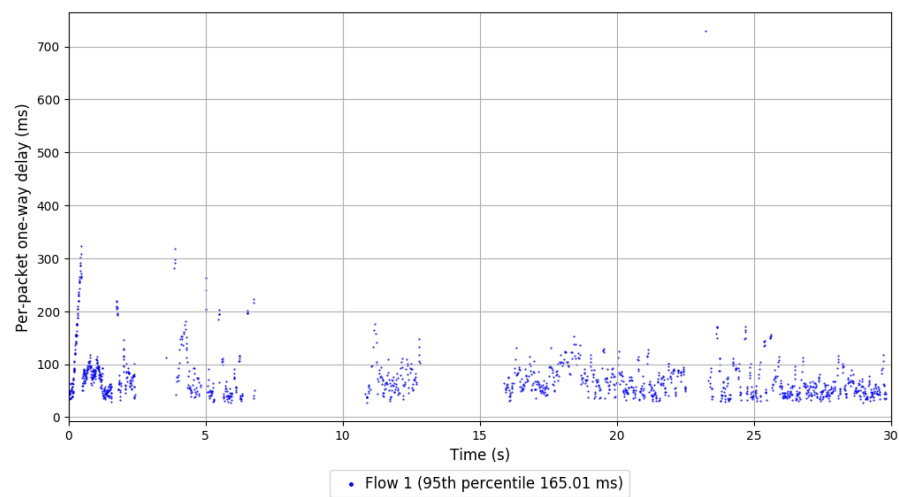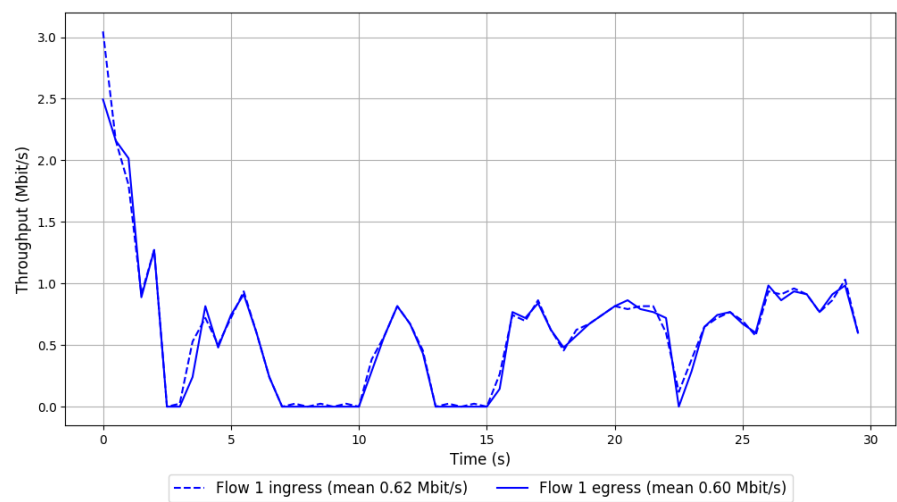

Flow 1 (95th percentile 110.66 ms)

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

Start at: 2018-01-25 20:00:29
End at: 2018-01-25 20:00:59
Local clock offset: -3.293 ms


# Below is generated by plot.py at 2018-01-26 00:18:30
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 165.008 ms
Loss rate: 2.86%
-- Flow 1:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 165.008 ms
Loss rate: 2.86%
```

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

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

Start at: 2018-01-25 20:47:10
End at: 2018-01-25 20:47:40
Local clock offset: -3.577 ms

# Below is generated by plot.py at 2018-01-26 00:18:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 109.118 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 109.118 ms
Loss rate: 0.26%
```
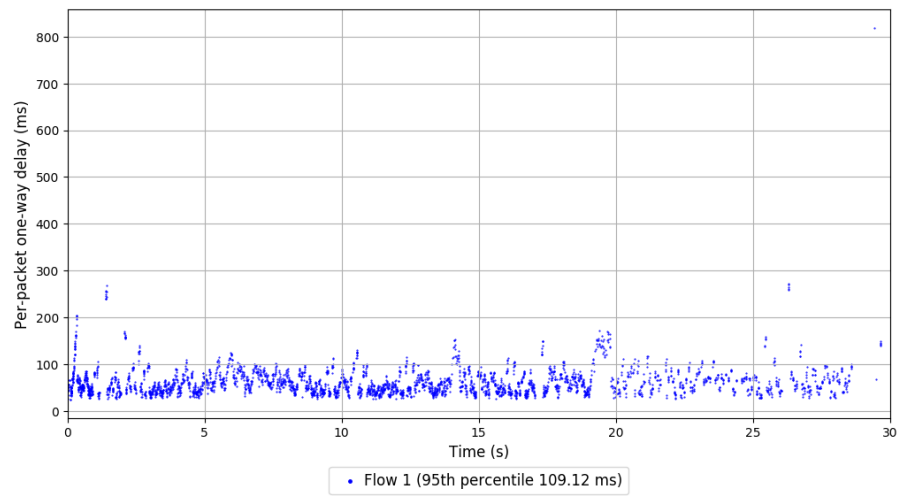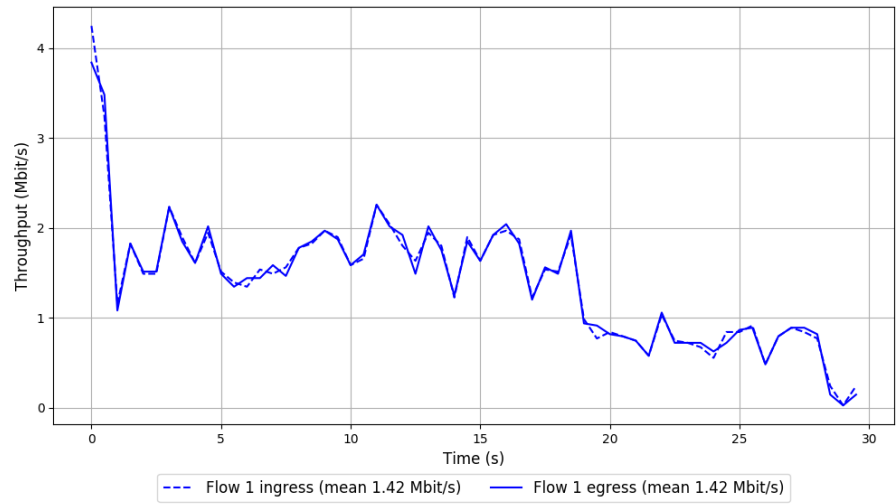
Run 2: Report of Indigo-1-32 — Data Link

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

Start at: 2018-01-25 21:33:52
End at: 2018-01-25 21:34:22
Local clock offset: -3.487 ms

# Below is generated by plot.py at 2018-01-26 00:18:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 123.162 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 123.162 ms
Loss rate: 0.23%
```
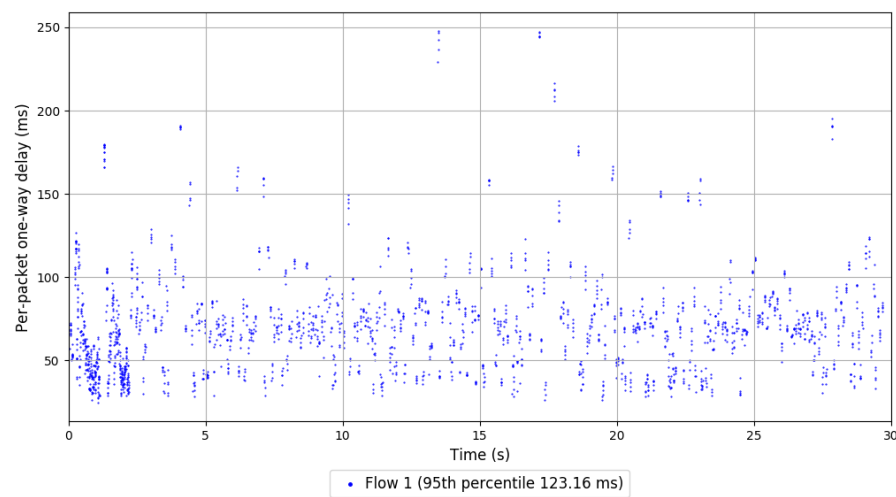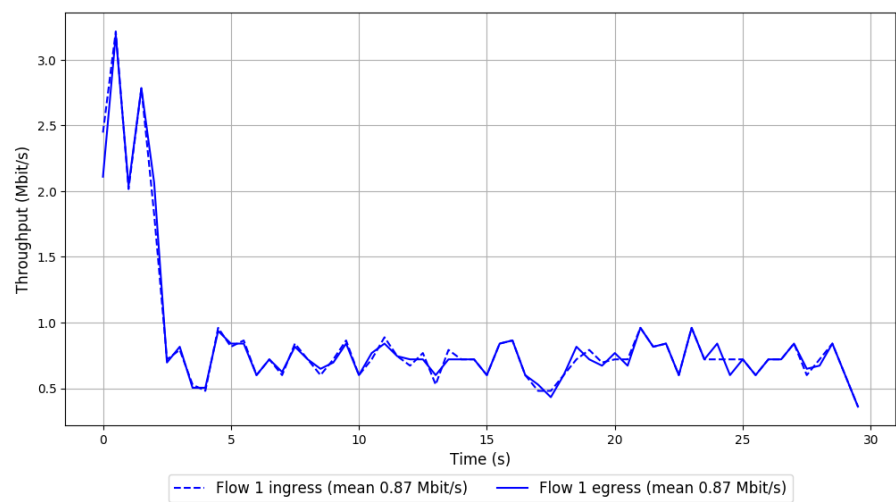
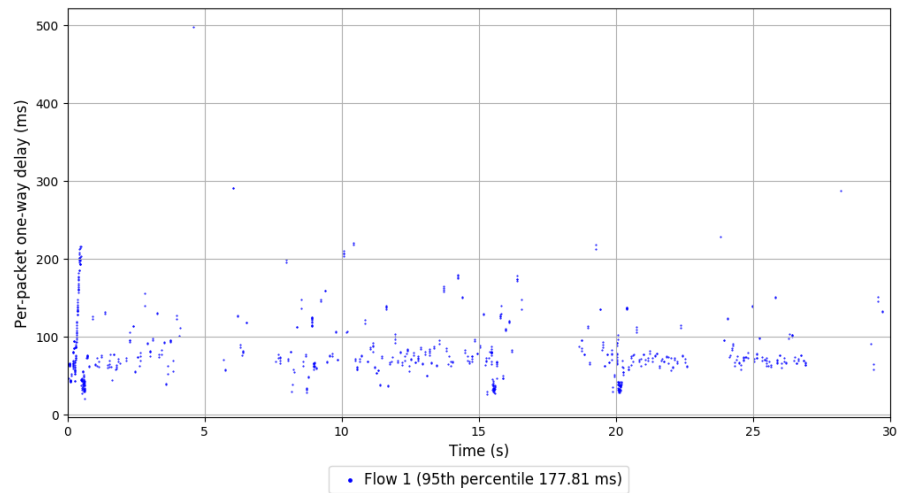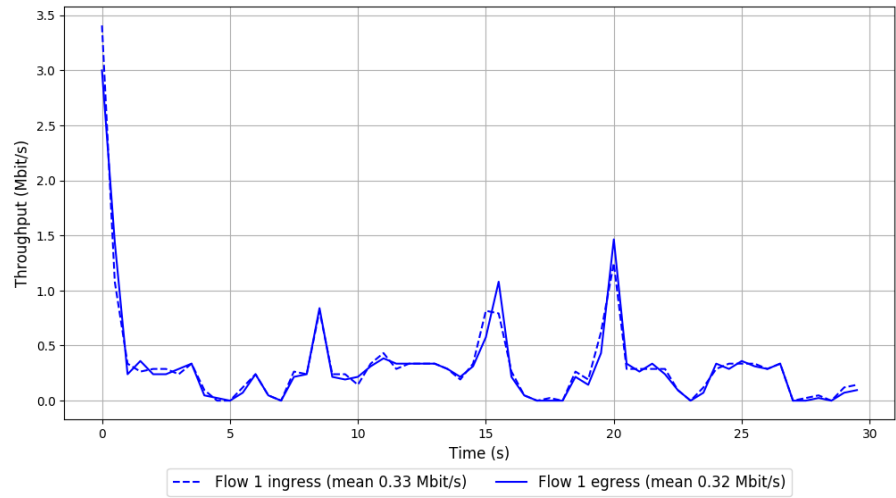# Run 3: Report of Indigo-1-32 — Data Link

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

Start at: 2018-01-25 20:23:49
End at: 2018-01-25 20:24:19
Local clock offset: -3.383 ms

# Below is generated by plot.py at 2018-01-26 00:18:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 177.813 ms
Loss rate: 2.47%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 177.813 ms
Loss rate: 2.47%
```

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

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

Start at: 2018-01-25 21:10:31
End at: 2018-01-25 21:11:01
Local clock offset: -3.374 ms


# Below is generated by plot.py at 2018-01-26 00:18:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 135.264 ms
Loss rate: 1.43%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 135.264 ms
Loss rate: 1.43%
```
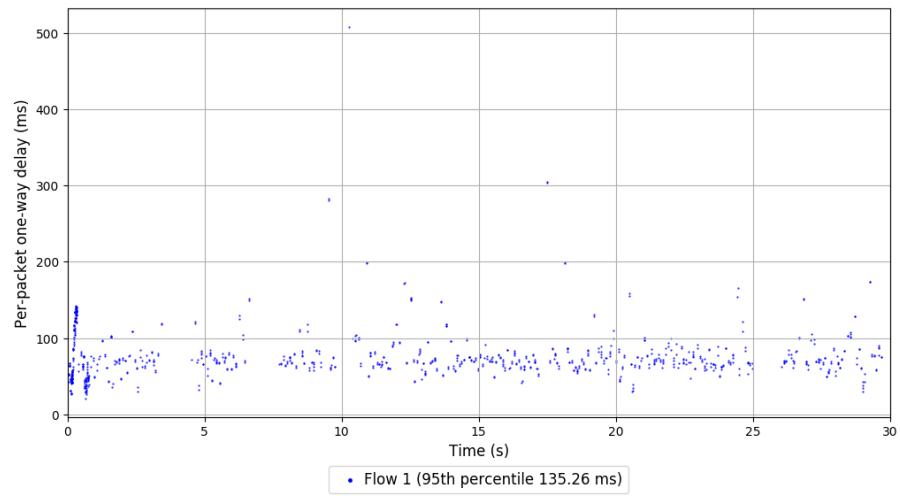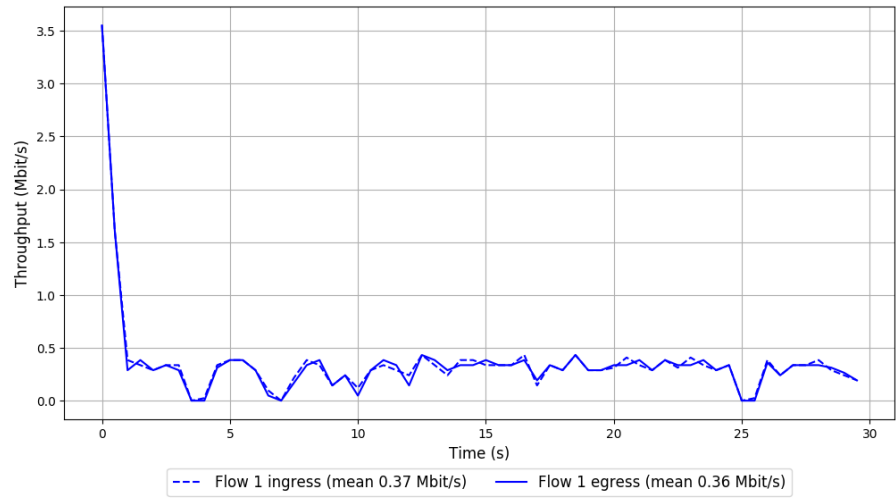
Run 2: Report of Indigo-1-128 — Data Link

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

Start at: 2018-01-25 21:57:13
End at: 2018-01-25 21:57:43
Local clock offset: -3.544 ms

# Below is generated by plot.py at 2018-01-26 00:18:32
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 187.441 ms
Loss rate: 3.31%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 187.441 ms
Loss rate: 3.31%
```

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

Flow 1 ingress (mean 0.32 Mbit/s)   Flow 1 egress (mean 0.31 Mbit/s)

• Flow 1 (95th percentile 187.44 ms)