Pantheon Report

Generated at 2018-04-03 01:59:37 (UTC).

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

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

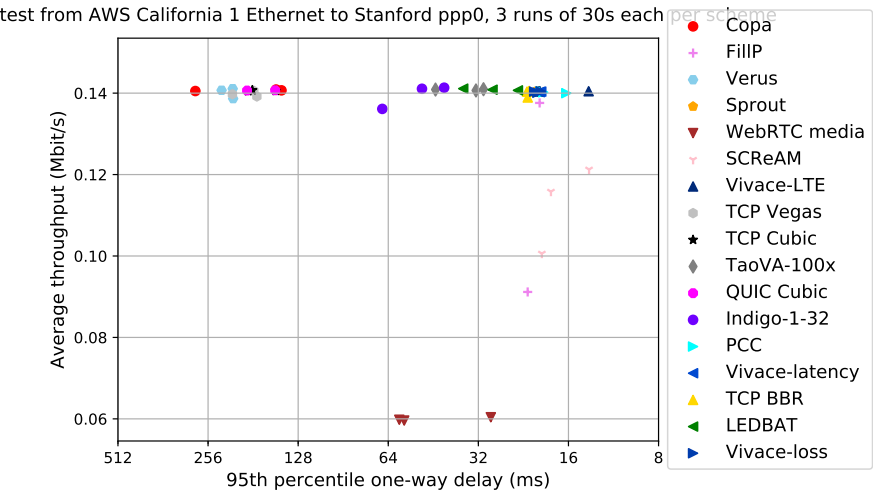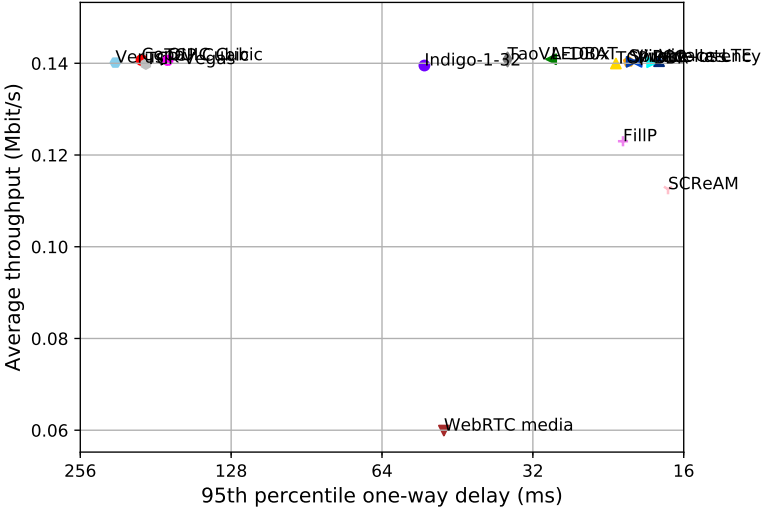Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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 @ eb420b5be9bafccd22cf68b99ff5a2000462fc59
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/fillp @ 11f8c46a2bf1dc797253db7e8ca04076272b2a44
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2
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 @ 7a4ba531e75b4a6f66f5c4580192120401784ce3
third_party/webrtc @ f271183af822eee5d0031620f4bebf38aedc5581
```

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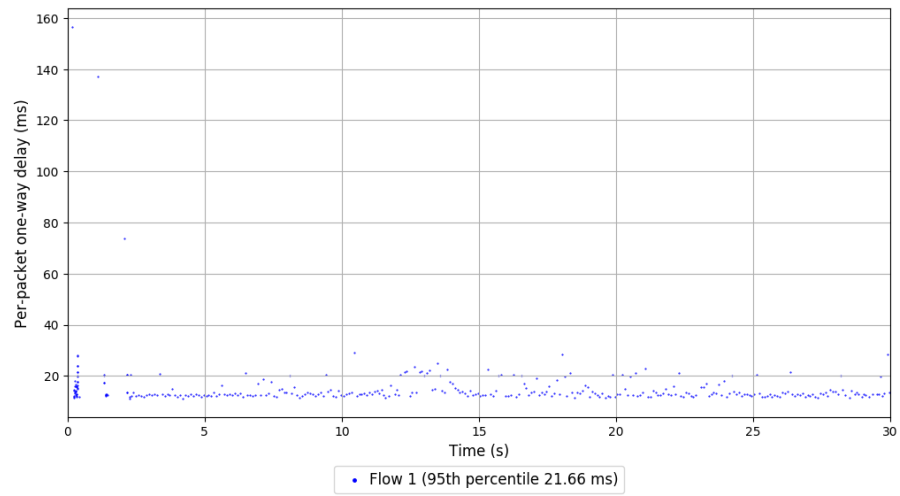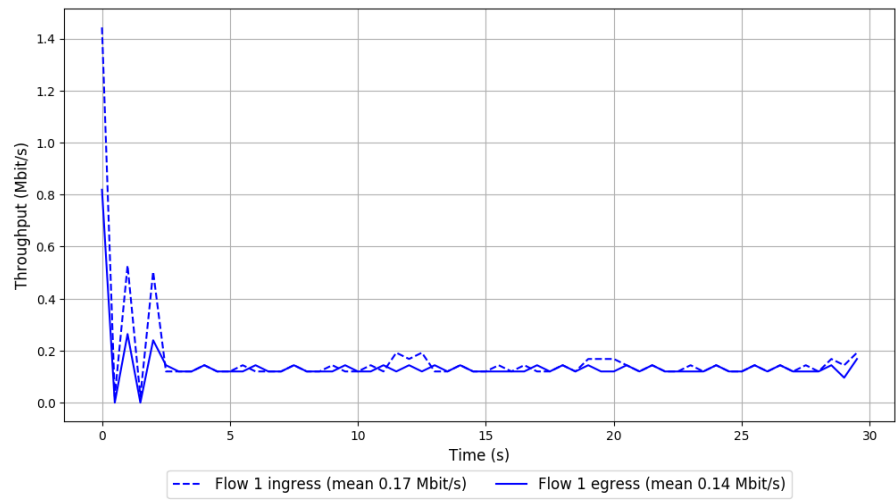

test from AWS California 1 Ethernet to Stanford ppp0, 3 runs of 30s each per scheme

scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	0.14	21.85	19.36
TCP Cubic	3	0.14	174.07	31.66
LEDBAT	3	0.14	29.42	32.67
PCC	3	0.14	18.50	94.46
QUIC Cubic	2	0.14	171.20	62.52
SCReAM	3	0.11	17.20	1.07
WebRTC media	3	0.06	48.16	38.83
Sprout	3	0.14	20.61	51.24
TaoVA-100x	3	0.14	35.95	92.72
TCP Vegas	3	0.14	189.39	31.73
Verus	3	0.14	217.86	86.09
Copa	3	0.14	193.17	49.65
FillP	3	0.12	21.15	84.69
Indigo-1-32	3	0.14	52.67	77.03
Vivace-latency	3	0.14	19.87	88.33
Vivace-loss	3	0.14	20.32	88.06
Vivace-LTE	3	0.14	17.92	88.28

```
Run 1: Statistics of TCP BBR

Start at: 2018-04-03 01:05:41
End at: 2018-04-03 01:06:11
Local clock offset: -3.418 ms
Remote clock offset: -5.201 ms

# Below is generated by plot.py at 2018-04-03 01:59:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.662 ms
Loss rate: 16.10%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.662 ms
Loss rate: 16.10%
```
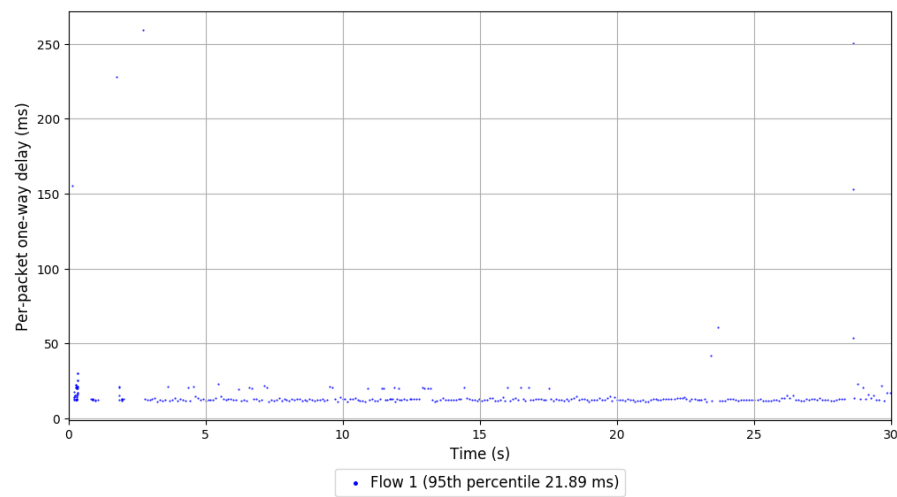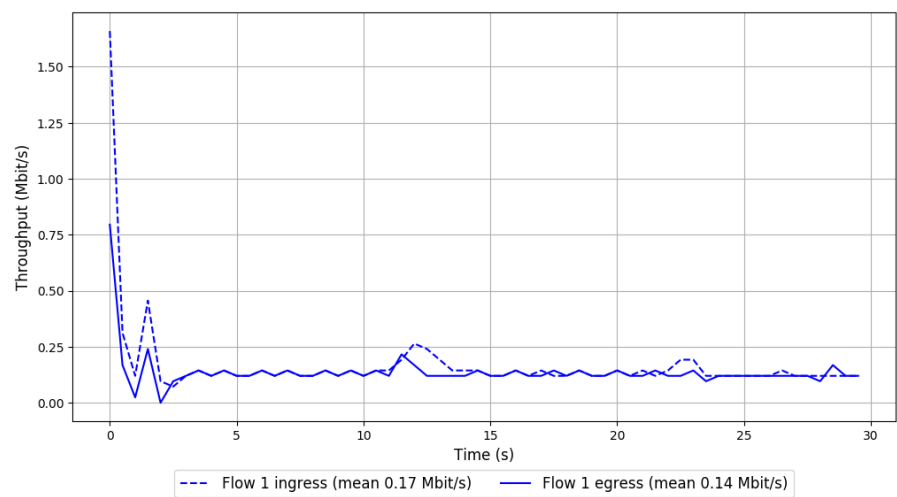
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2018-04-03 01:29:10
End at: 2018-04-03 01:29:40
Local clock offset: -1.596 ms
Remote clock offset: -5.648 ms


# Below is generated by plot.py at 2018-04-03 01:59:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.889 ms
Loss rate: 18.63%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.889 ms
Loss rate: 18.63%
```

Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2018-04-03 01:52:39
End at: 2018-04-03 01:53:09
Local clock offset: -1.036 ms
Remote clock offset: -6.52 ms


# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 22.005 ms
Loss rate: 23.34%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 22.005 ms
Loss rate: 23.34%
```
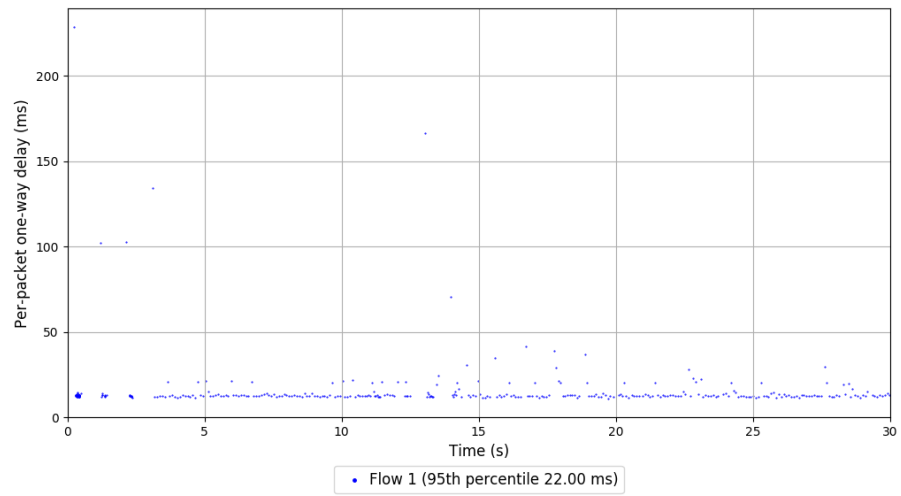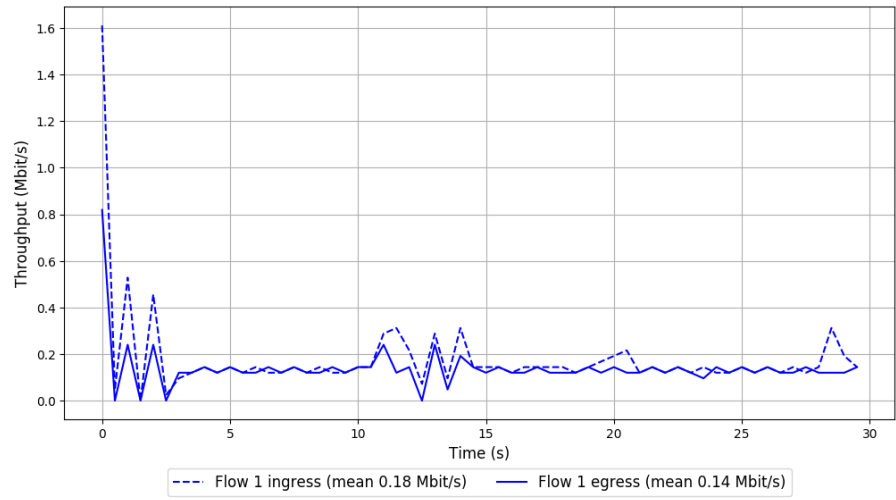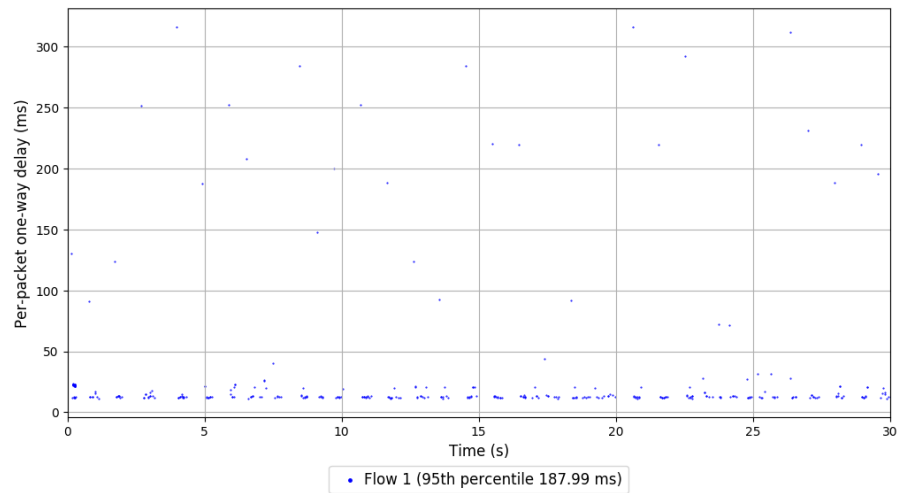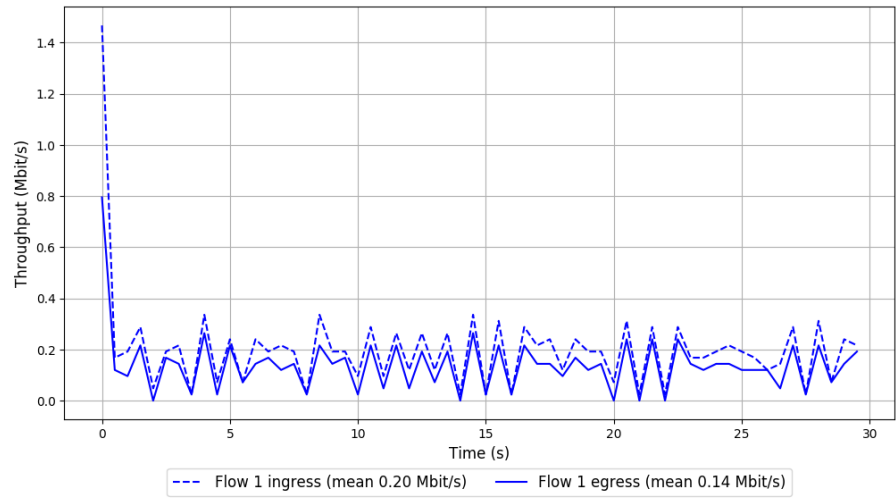
Run 3: Report of TCP BBR — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: 2018-04-03 00:55:14
End at: 2018-04-03 00:55:44
Local clock offset: -4.834 ms
Remote clock offset: -5.046 ms


# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 187.987 ms
Loss rate: 31.02%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 187.987 ms
Loss rate: 31.02%
```
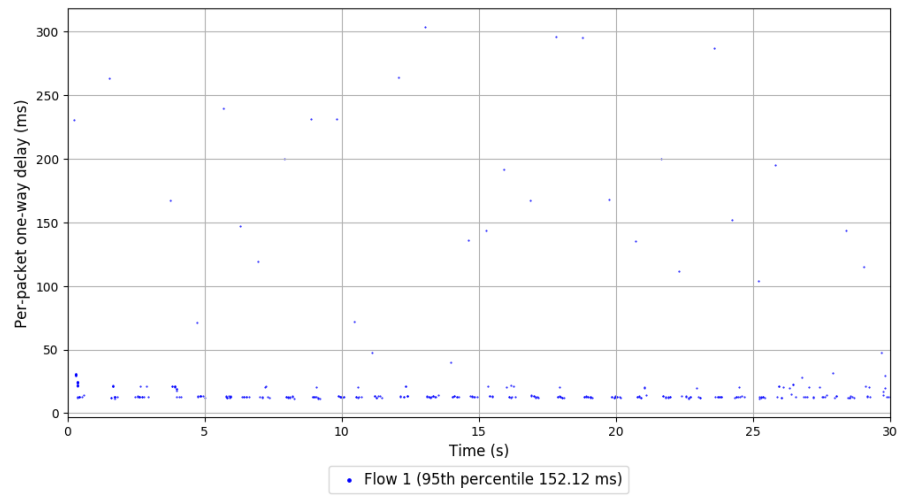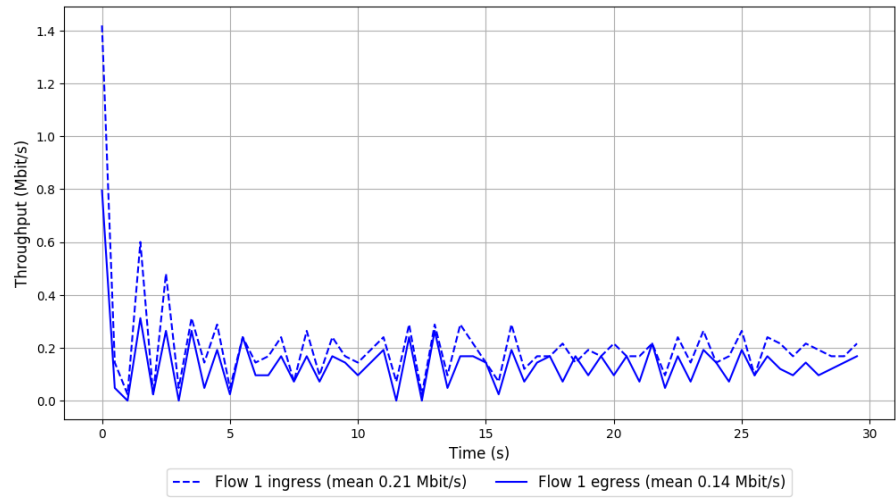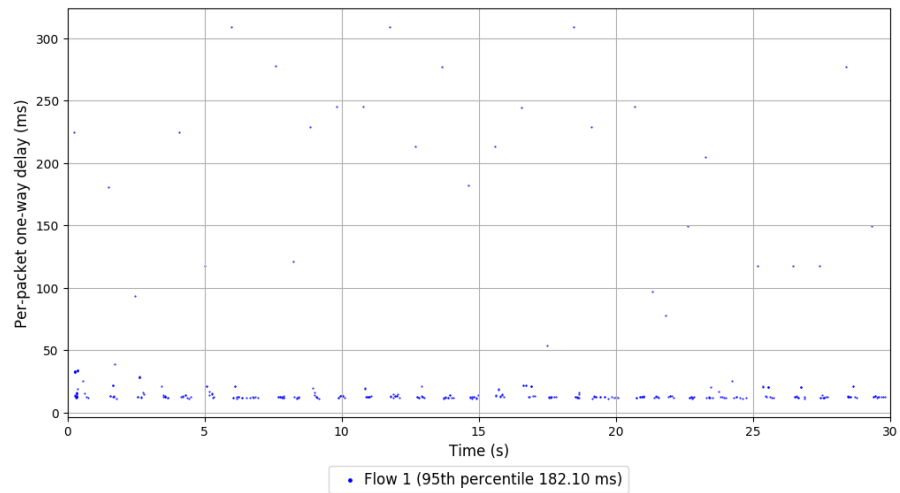
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.20 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 187.99 ms)

```
Run 2: Statistics of TCP Cubic

Start at: 2018-04-03 01:18:43
End at: 2018-04-03 01:19:13
Local clock offset: -3.44 ms
Remote clock offset: -5.25 ms

# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 152.120 ms
Loss rate: 32.94%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 152.120 ms
Loss rate: 32.94%
```

Run 2: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.21 Mbit/s) — — —   Flow 1 egress (mean 0.14 Mbit/s) ———
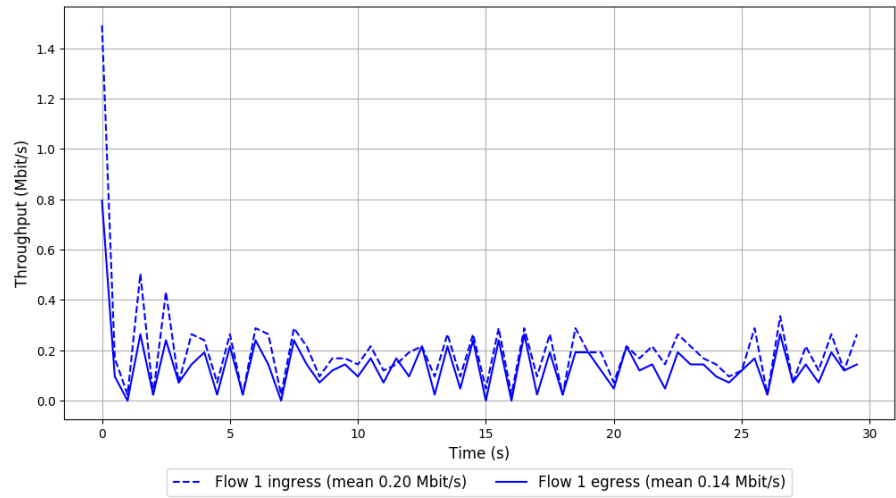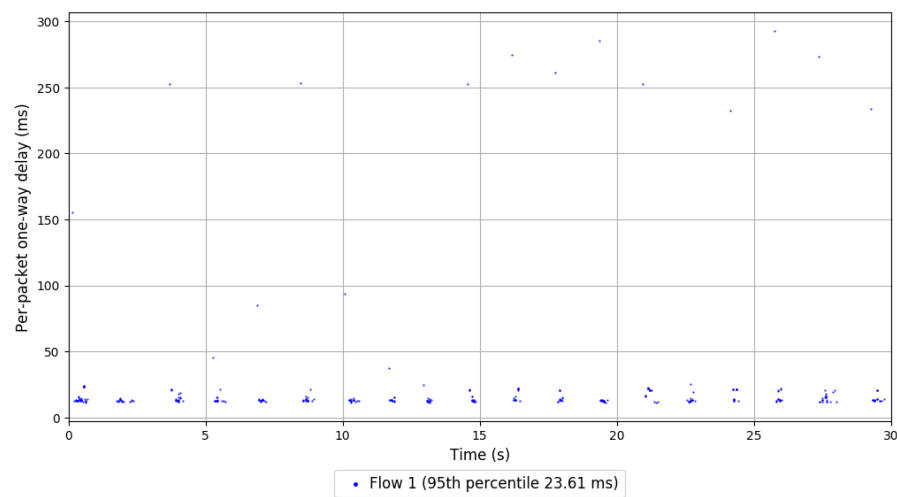

Flow 1 (95th percentile 152.12 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2018-04-03 01:42:13
End at: 2018-04-03 01:42:43
Local clock offset: -1.103 ms
Remote clock offset: -6.238 ms


# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 182.096 ms
Loss rate: 31.01%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 182.096 ms
Loss rate: 31.01%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.20 Mbit/s)　　Flow 1 egress (mean 0.14 Mbit/s)

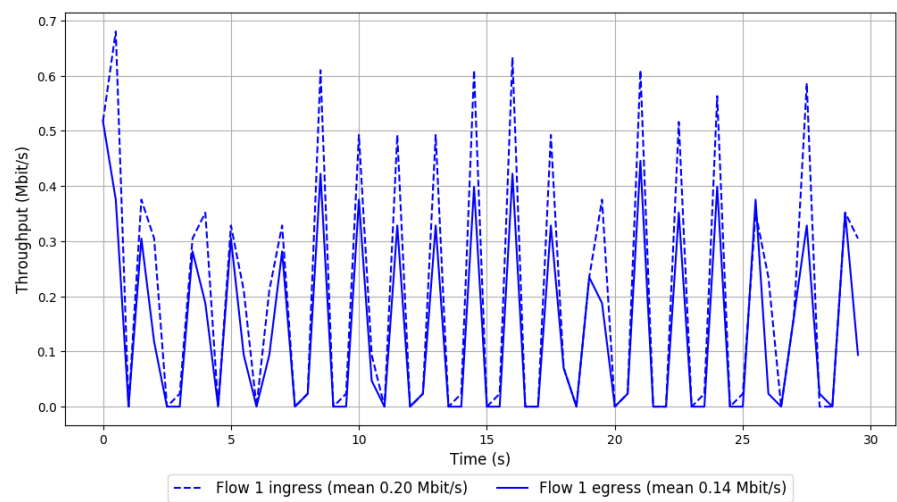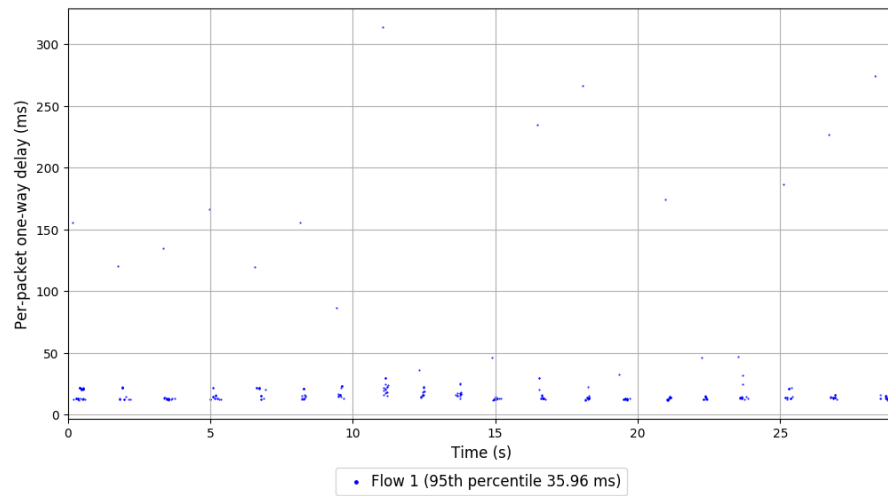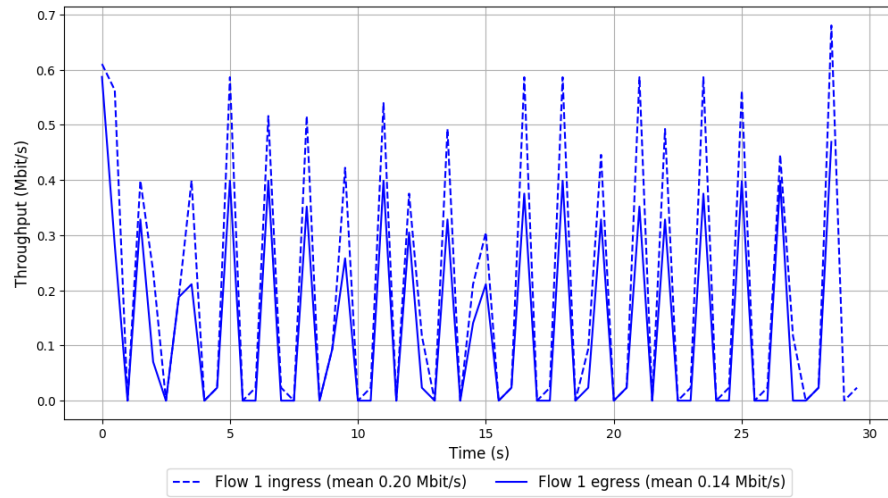Flow 1 (95th percentile 182.10 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2018-04-03 01:06:59
End at: 2018-04-03 01:07:29
Local clock offset: -3.32 ms
Remote clock offset: -5.256 ms


# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 23.606 ms
Loss rate: 31.20%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 23.606 ms
Loss rate: 31.20%
```

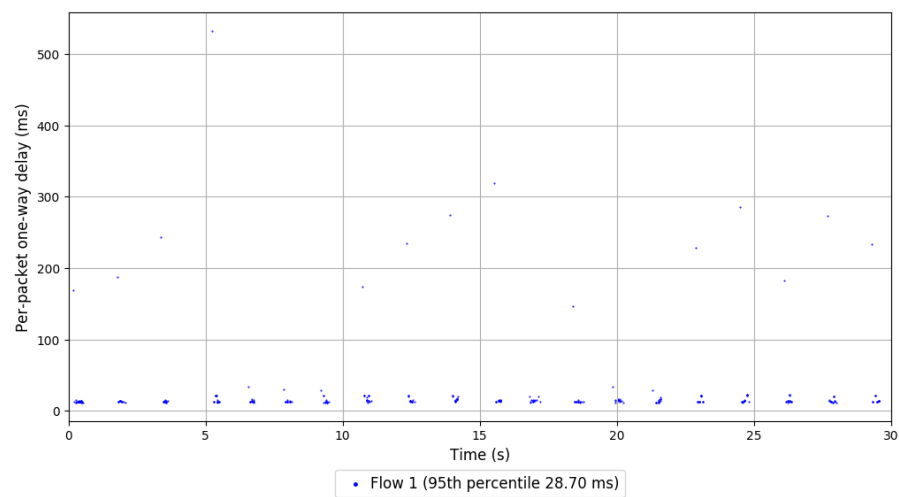Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-04-03 01:30:28
End at: 2018-04-03 01:30:58
Local clock offset: -1.447 ms
Remote clock offset: -5.711 ms


# Below is generated by plot.py at 2018-04-03 01:59:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 35.962 ms
Loss rate: 32.55%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 35.962 ms
Loss rate: 32.55%
```

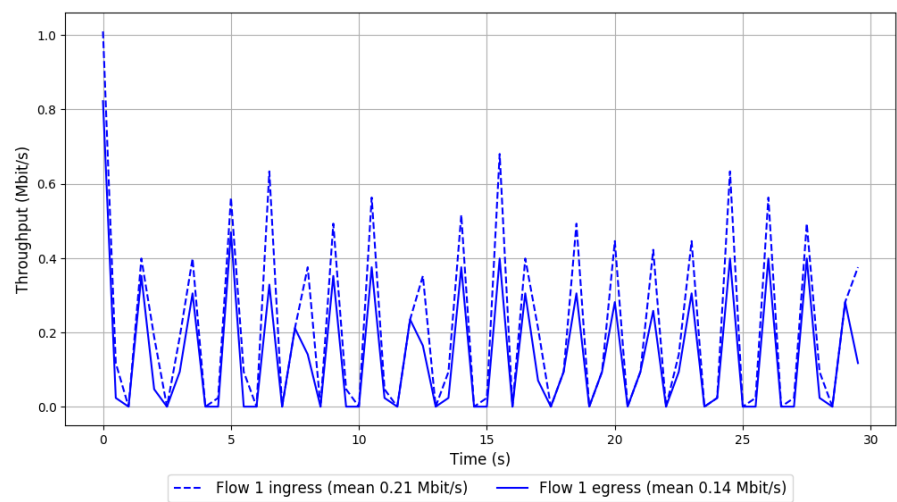Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2018-04-03 01:53:57
End at: 2018-04-03 01:54:27
Local clock offset: -0.807 ms
Remote clock offset: -6.434 ms


# Below is generated by plot.py at 2018-04-03 01:59:12
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 28.700 ms
Loss rate: 34.26%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 28.700 ms
Loss rate: 34.26%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 0.21 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

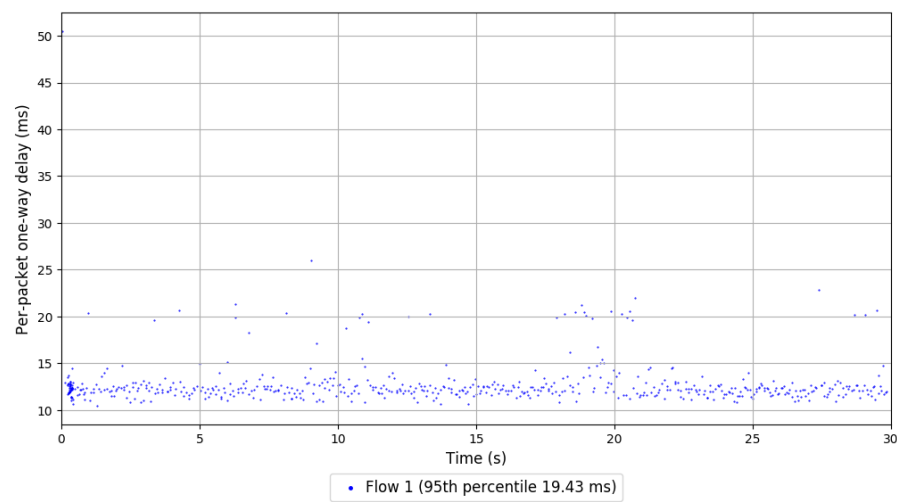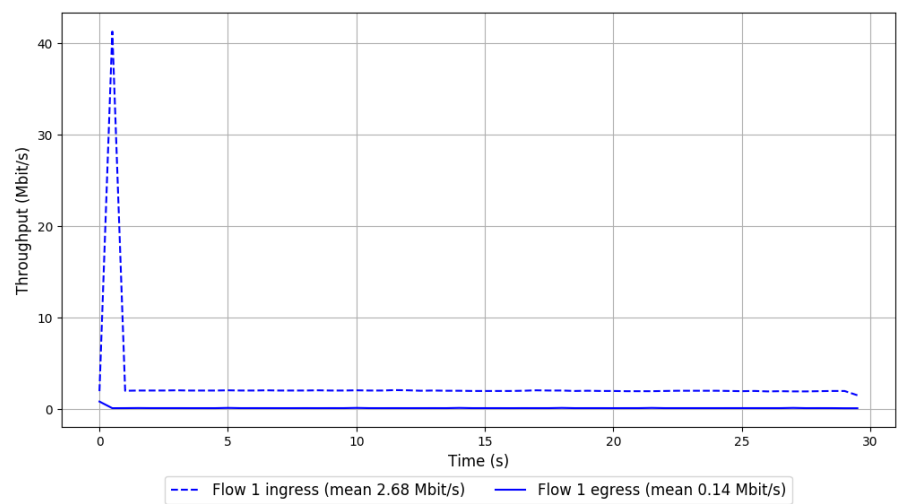Flow 1 (95th percentile 28.70 ms)

```
Run 1: Statistics of PCC

Start at: 2018-04-03 01:04:22
End at: 2018-04-03 01:04:52
Local clock offset: -3.369 ms
Remote clock offset: -5.217 ms


# Below is generated by plot.py at 2018-04-03 01:59:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.428 ms
Loss rate: 94.78%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.428 ms
Loss rate: 94.78%
```
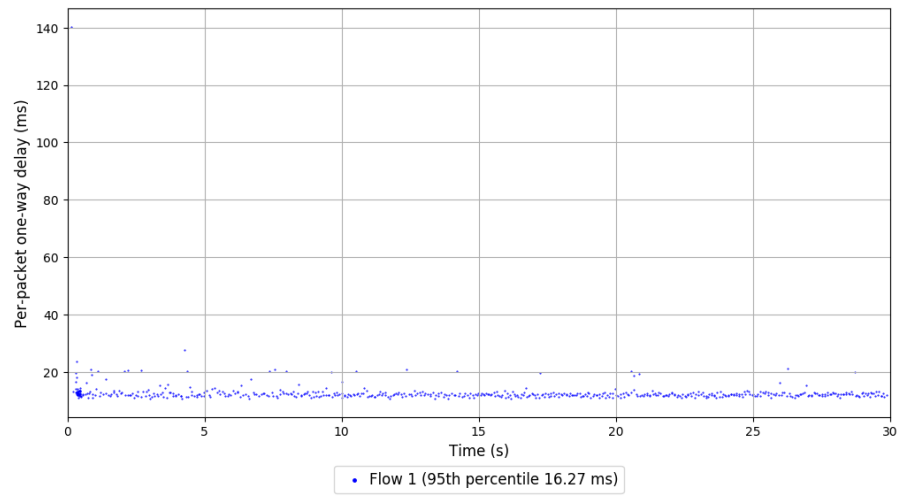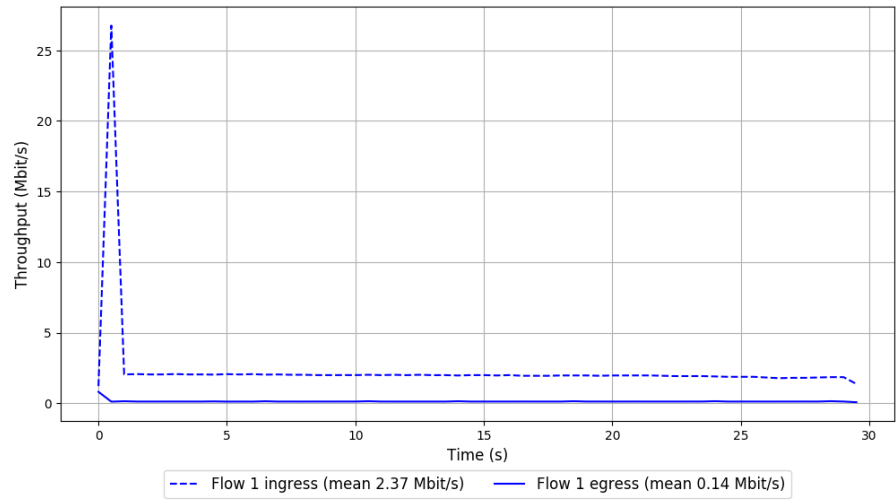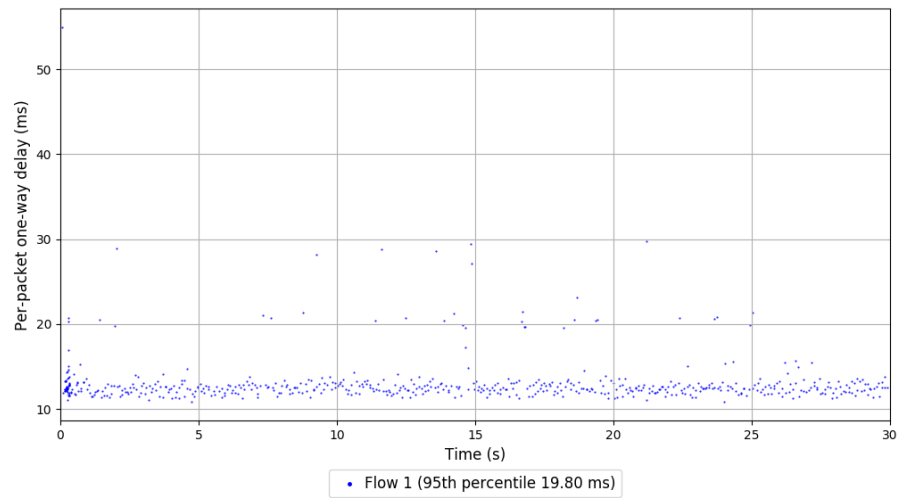
Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 2.68 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 19.43 ms)

```
Run 2: Statistics of PCC

Start at: 2018-04-03 01:27:51
End at: 2018-04-03 01:28:21
Local clock offset: -1.598 ms
Remote clock offset: -5.64 ms


# Below is generated by plot.py at 2018-04-03 01:59:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 16.266 ms
Loss rate: 94.12%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 16.266 ms
Loss rate: 94.12%
```

Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 2.37 Mbit/s) Flow 1 egress (mean 0.14 Mbit/s)
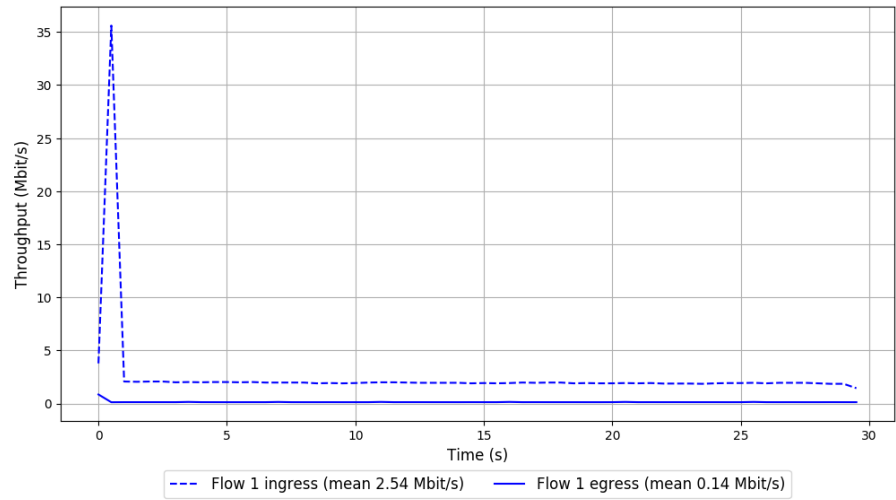

Flow 1 (95th percentile 16.27 ms)

```
Run 3: Statistics of PCC

Start at: 2018-04-03 01:51:21
End at: 2018-04-03 01:51:51
Local clock offset: -1.299 ms
Remote clock offset: -6.435 ms


# Below is generated by plot.py at 2018-04-03 01:59:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.804 ms
Loss rate: 94.48%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.804 ms
Loss rate: 94.48%
```

Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 2.54 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 19.80 ms)

27

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-04-03 00:50:01
End at: 2018-04-03 00:50:32
Local clock offset: -7.615 ms
Remote clock offset: -4.873 ms
```
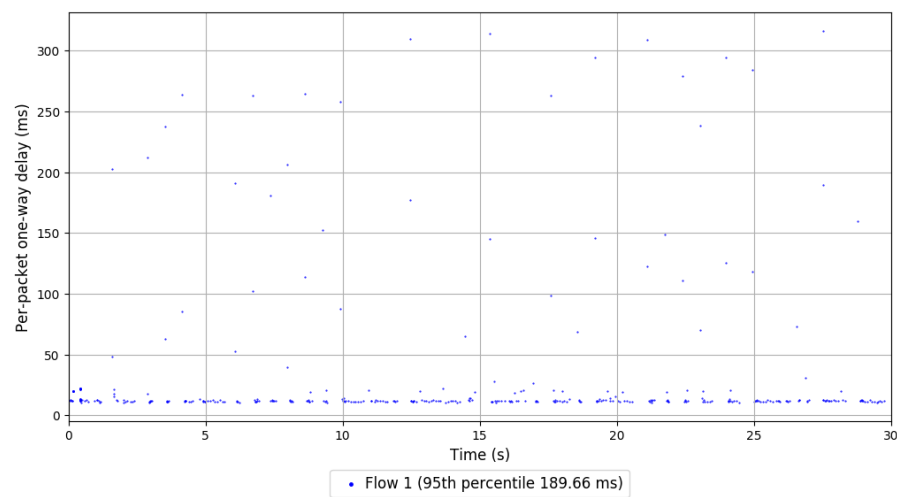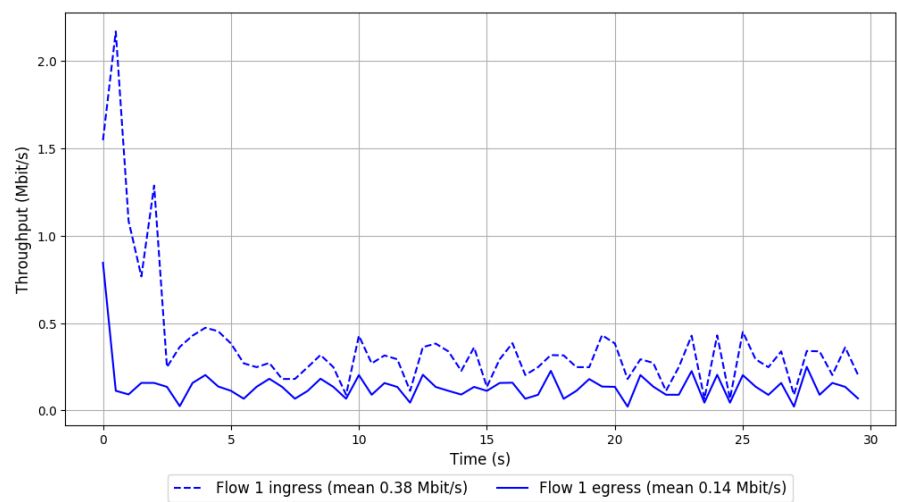
Run 1: Report of QUIC Cubic — Data Link

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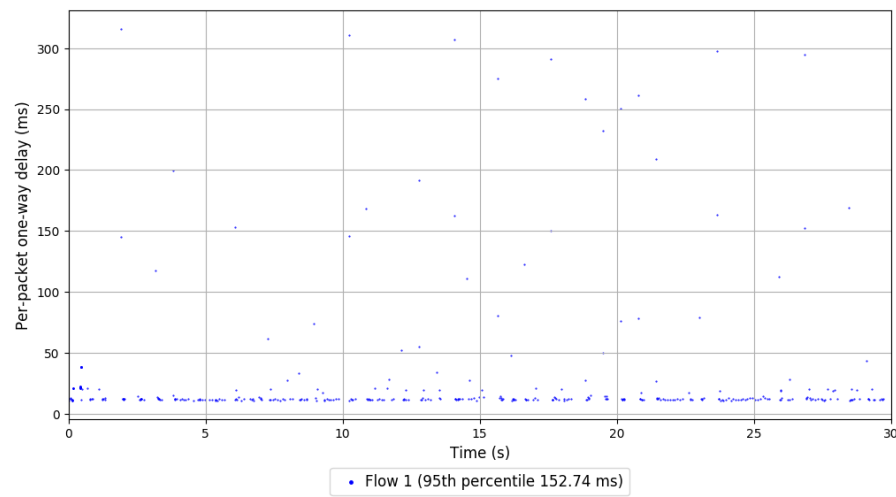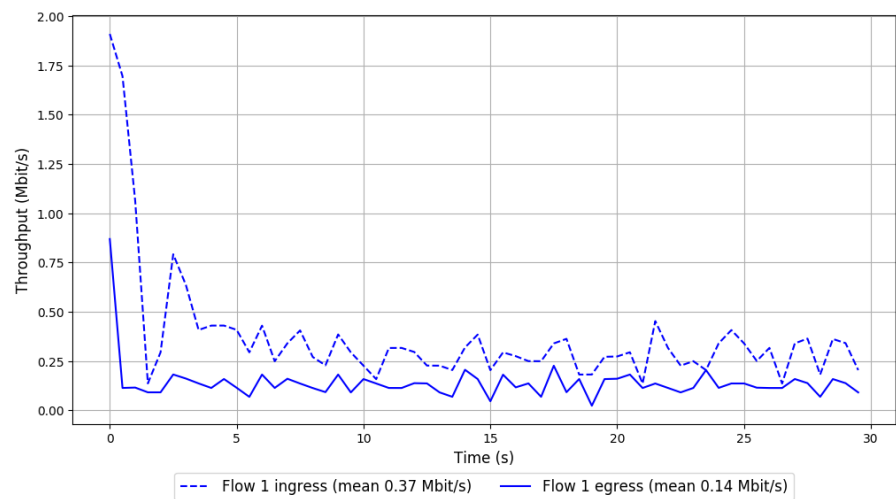

Flow 1 (95th percentile 20.02 ms)

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-04-03 01:13:29
End at: 2018-04-03 01:14:00
Local clock offset: -3.697 ms
Remote clock offset: -5.228 ms


# Below is generated by plot.py at 2018-04-03 01:59:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 189.655 ms
Loss rate: 62.90%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 189.655 ms
Loss rate: 62.90%
```
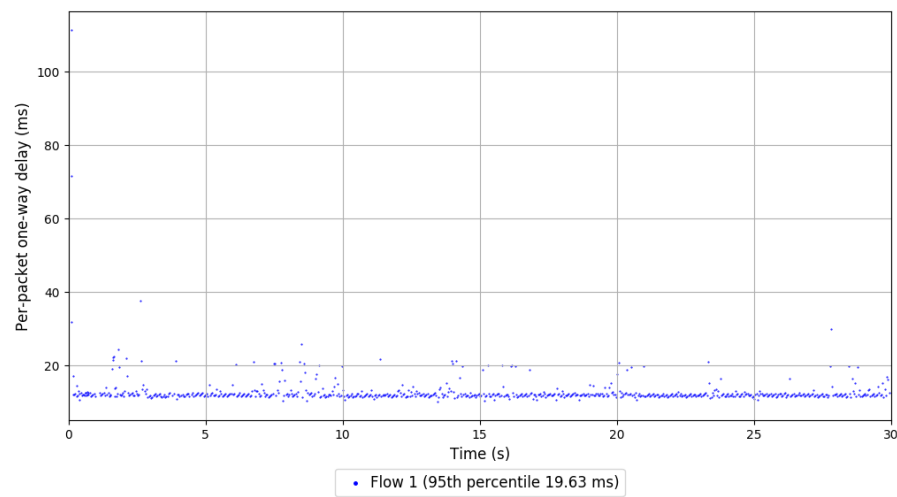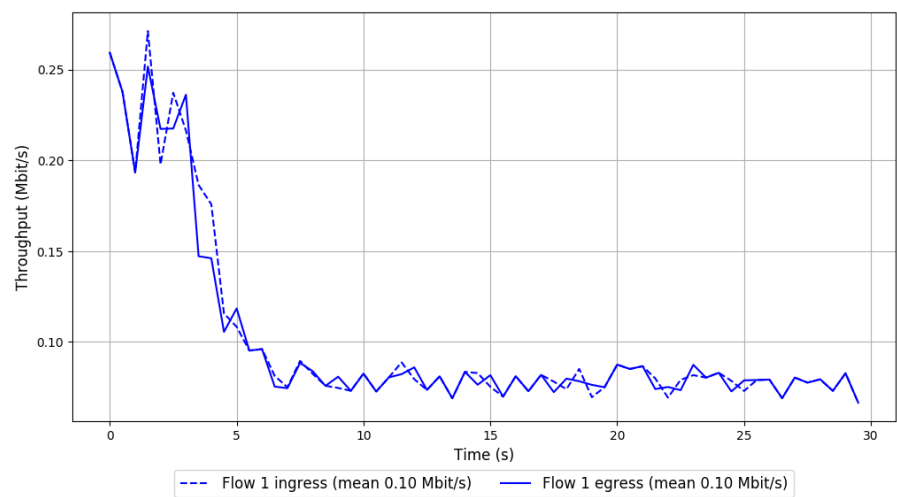
Run 2: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.38 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 189.66 ms)

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-04-03 01:37:00
End at: 2018-04-03 01:37:30
Local clock offset: -1.218 ms
Remote clock offset: -6.093 ms


# Below is generated by plot.py at 2018-04-03 01:59:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 152.744 ms
Loss rate: 62.13%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 152.744 ms
Loss rate: 62.13%
```

Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.37 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)
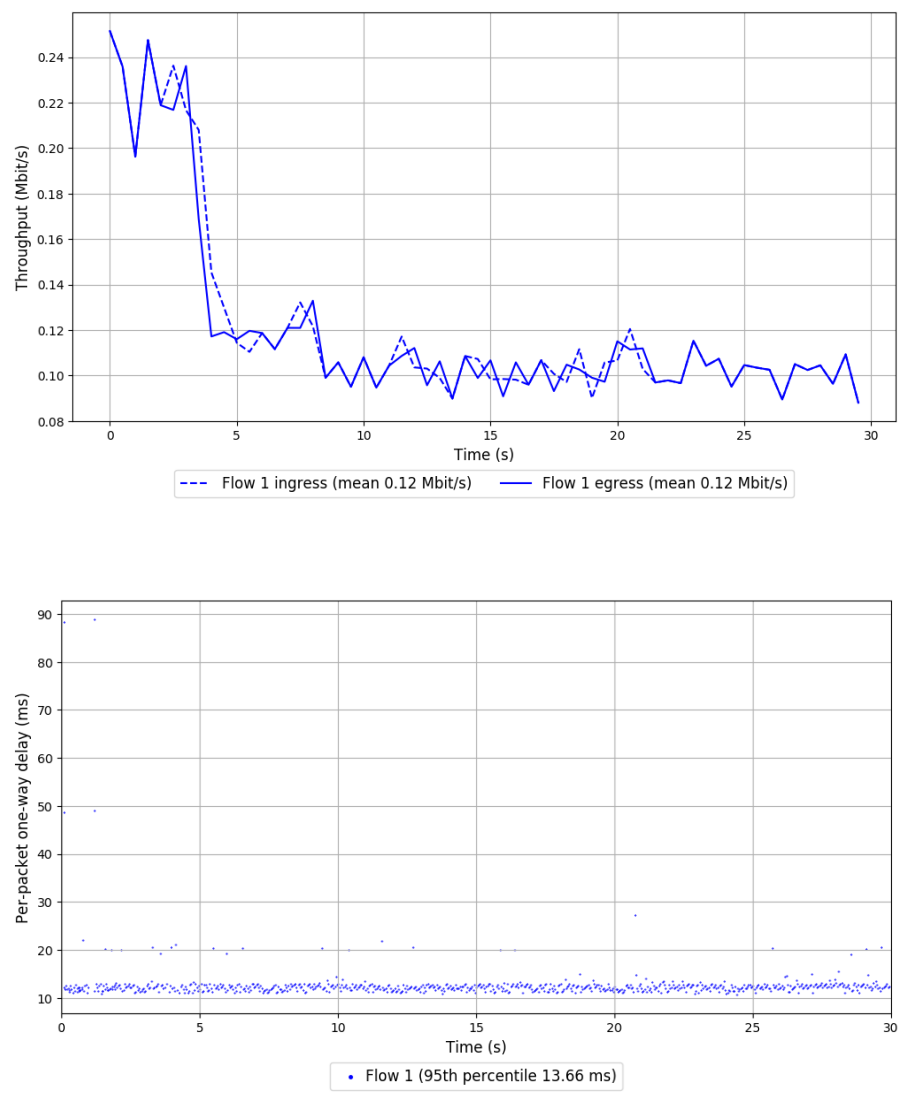

Flow 1 (95th percentile 152.74 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-04-03 01:01:46
End at: 2018-04-03 01:02:16
Local clock offset: -3.497 ms
Remote clock offset: -5.19 ms


# Below is generated by plot.py at 2018-04-03 01:59:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 19.632 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 19.632 ms
Loss rate: 1.14%
```
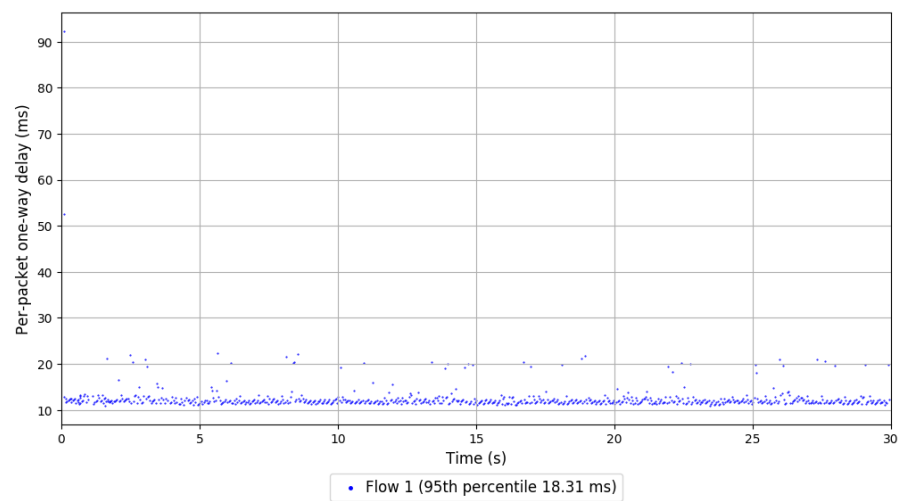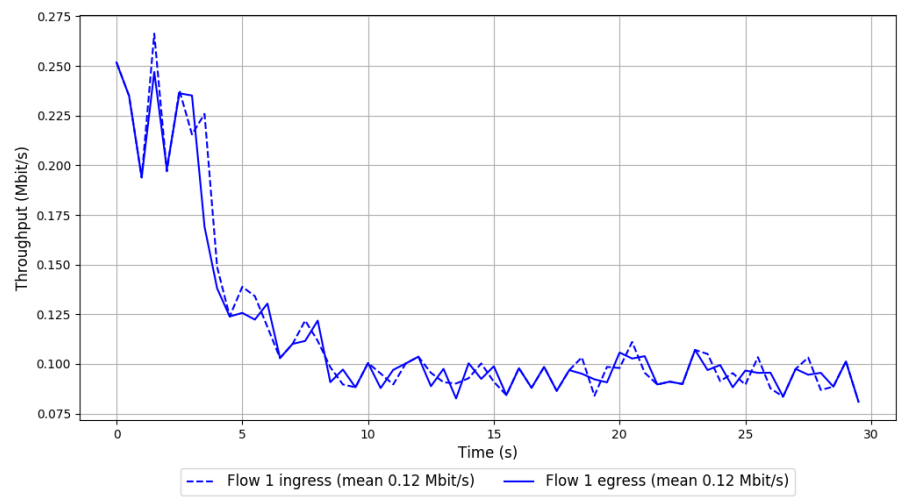
Run 1: Report of SCReAM — Data Link

```
Run 2: Statistics of SCReAM

Start at: 2018-04-03 01:25:15
End at: 2018-04-03 01:25:45
Local clock offset: -1.853 ms
Remote clock offset: -5.368 ms


# Below is generated by plot.py at 2018-04-03 01:59:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 13.656 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 13.656 ms
Loss rate: 0.92%
```

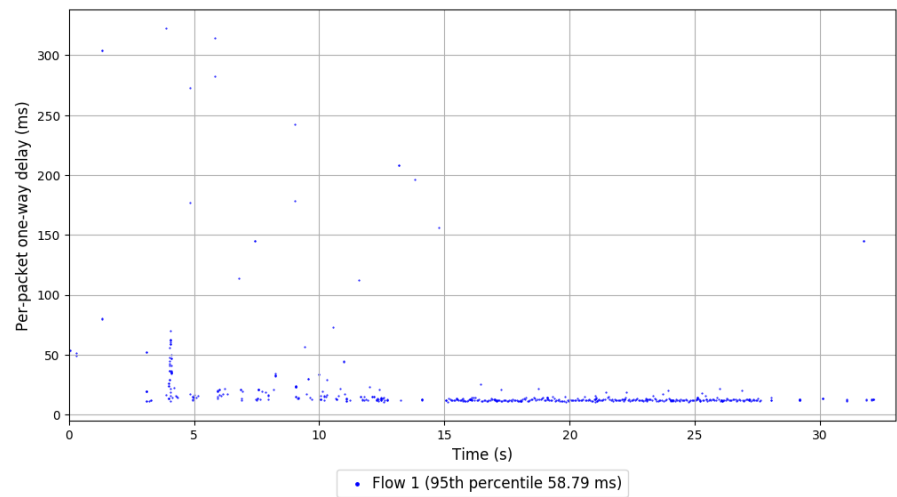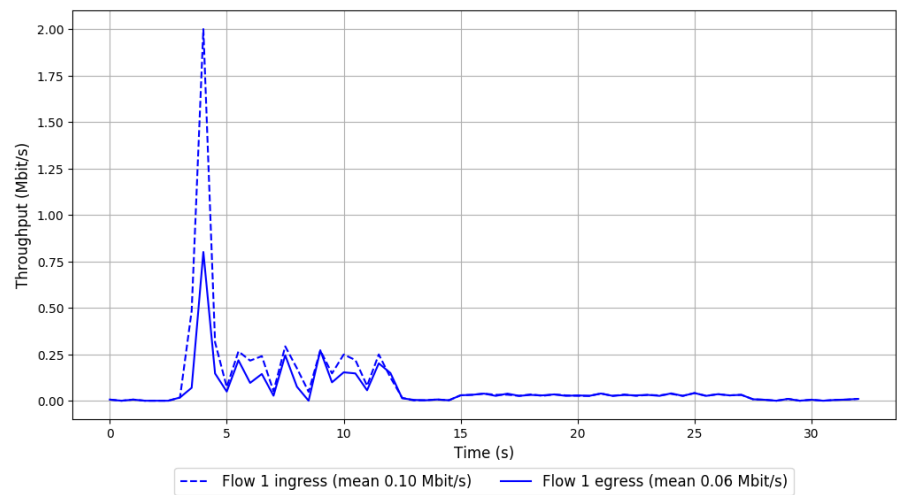Run 2: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.12 Mbit/s) --- Flow 1 egress (mean 0.12 Mbit/s) ——

Flow 1 (95th percentile 13.66 ms)

```
Run 3: Statistics of SCReAM

Start at: 2018-04-03 01:48:44
End at: 2018-04-03 01:49:14
Local clock offset: -1.172 ms
Remote clock offset: -6.451 ms


# Below is generated by plot.py at 2018-04-03 01:59:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 18.308 ms
Loss rate: 1.16%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 18.308 ms
Loss rate: 1.16%
```

Run 3: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.12 Mbit/s)   Flow 1 egress (mean 0.12 Mbit/s)

Flow 1 (95th percentile 18.31 ms)

```
Run 1: Statistics of WebRTC media

Start at: 2018-04-03 01:03:04
End at: 2018-04-03 01:03:34
Local clock offset: -3.402 ms
Remote clock offset: -5.156 ms

# Below is generated by plot.py at 2018-04-03 01:59:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 58.788 ms
Loss rate: 39.98%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 58.788 ms
Loss rate: 39.98%
```
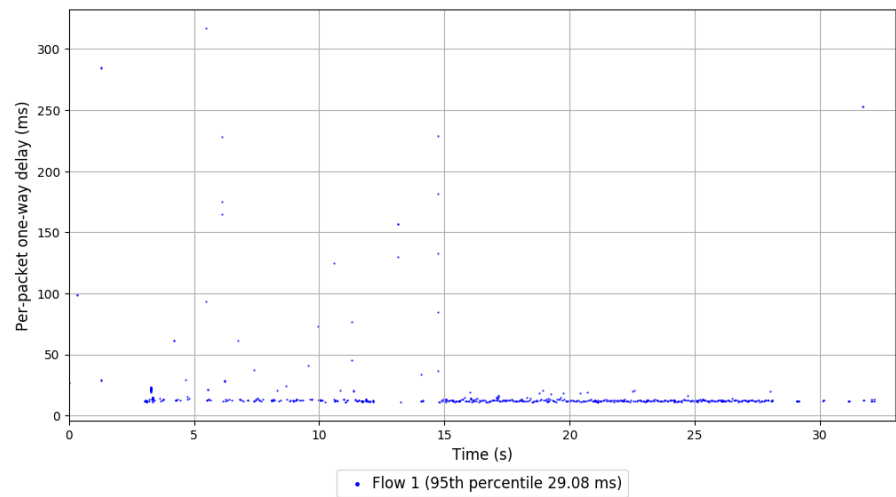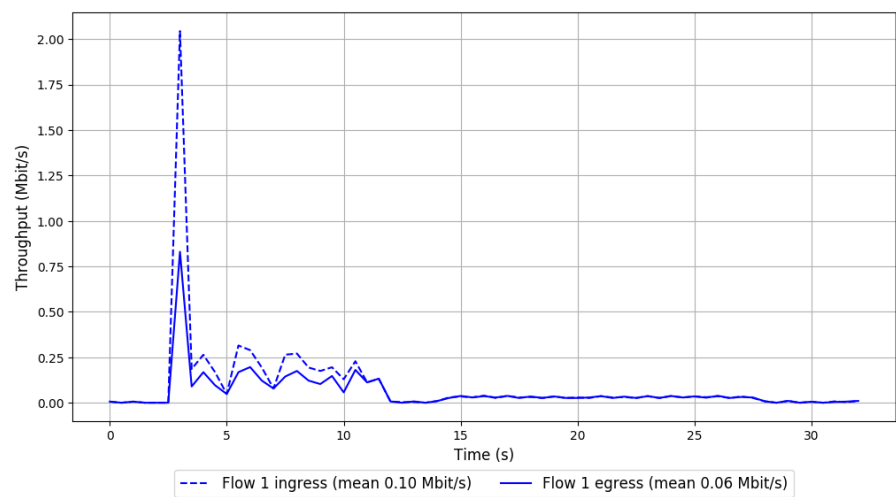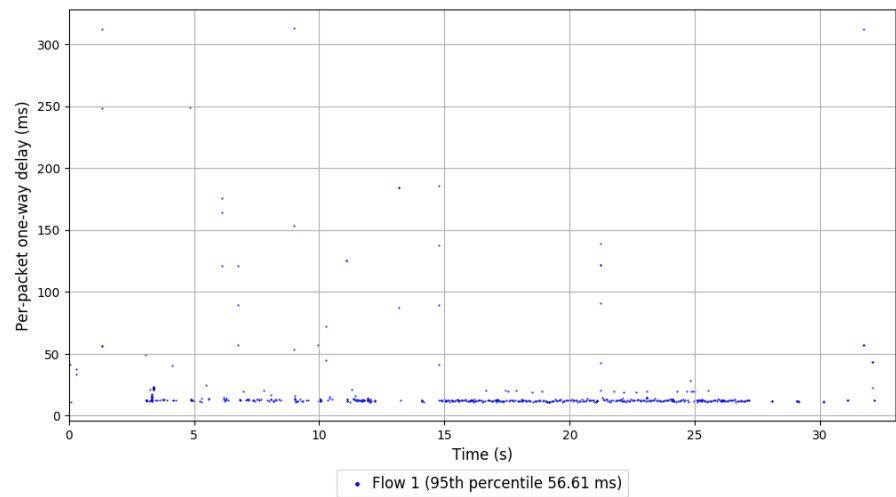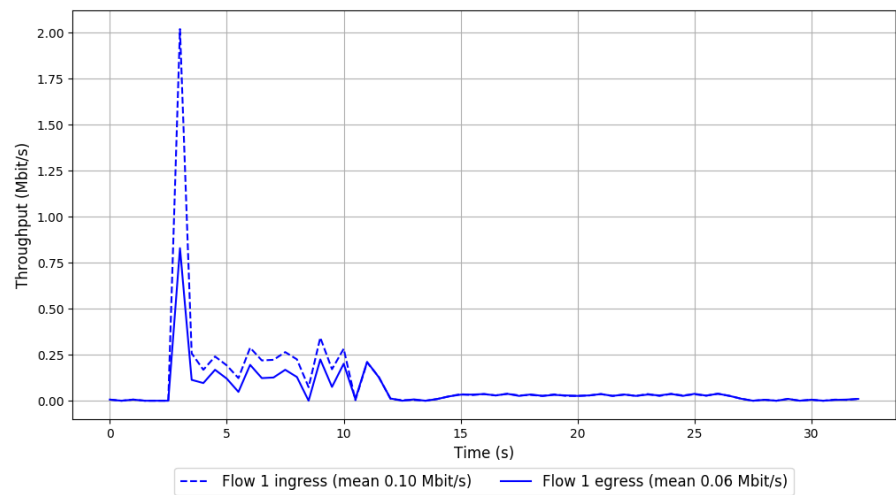
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-04-03 01:26:33
End at: 2018-04-03 01:27:03
Local clock offset: -1.741 ms
Remote clock offset: -5.447 ms


# Below is generated by plot.py at 2018-04-03 01:59:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 29.076 ms
Loss rate: 37.38%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 29.076 ms
Loss rate: 37.38%
```
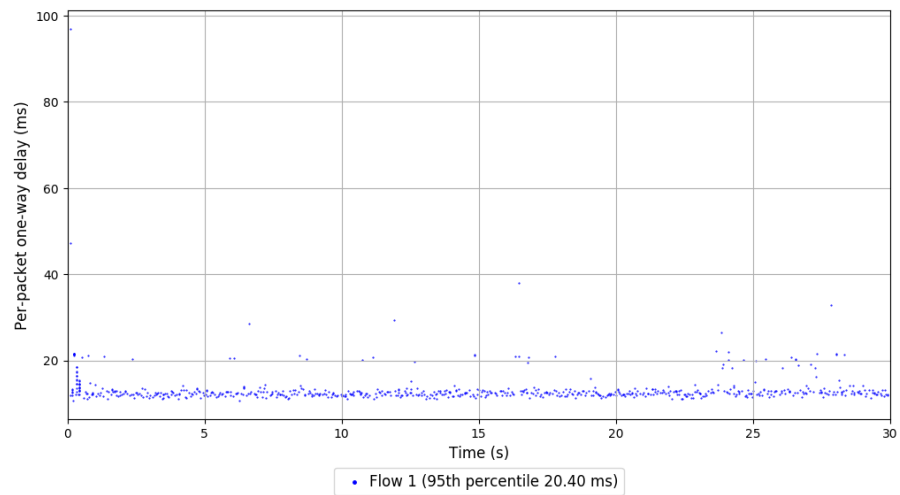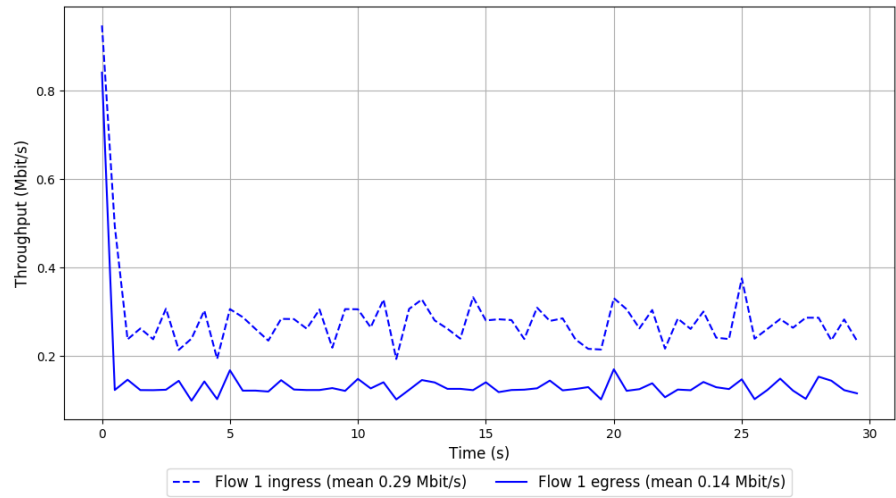
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-04-03 01:50:02
End at: 2018-04-03 01:50:32
Local clock offset: -1.286 ms
Remote clock offset: -6.372 ms


# Below is generated by plot.py at 2018-04-03 01:59:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 56.614 ms
Loss rate: 39.14%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 56.614 ms
Loss rate: 39.14%
```
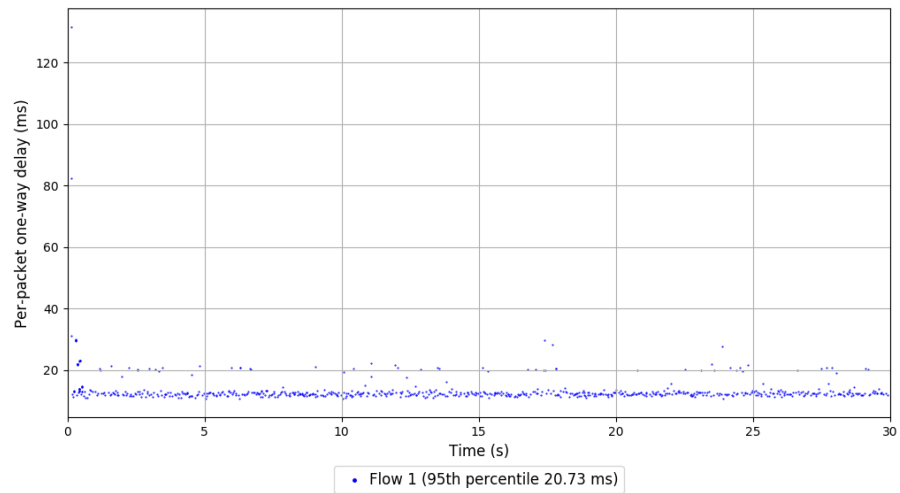
Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-04-03 00:53:56
End at: 2018-04-03 00:54:26
Local clock offset: -5.314 ms
Remote clock offset: -4.979 ms


# Below is generated by plot.py at 2018-04-03 01:59:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.399 ms
Loss rate: 51.06%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.399 ms
Loss rate: 51.06%
```

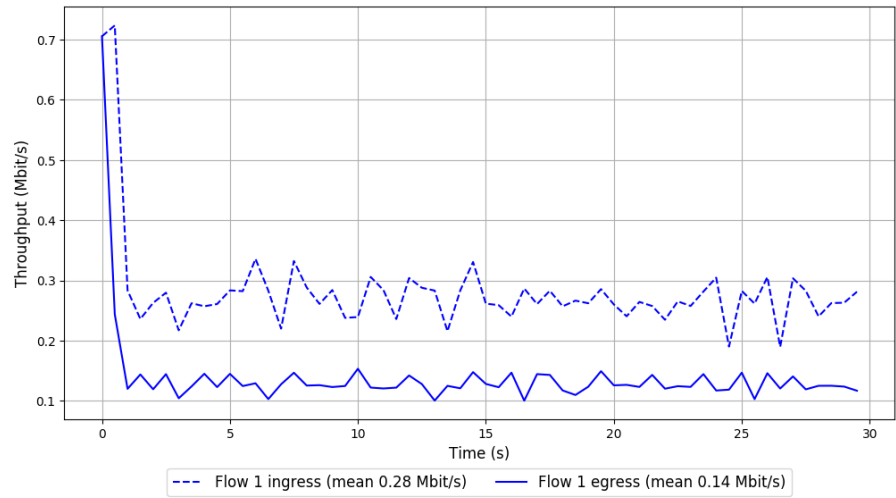Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-04-03 01:17:25
End at: 2018-04-03 01:17:55
Local clock offset: -3.808 ms
Remote clock offset: -5.341 ms


# Below is generated by plot.py at 2018-04-03 01:59:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.726 ms
Loss rate: 50.73%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.726 ms
Loss rate: 50.73%
```

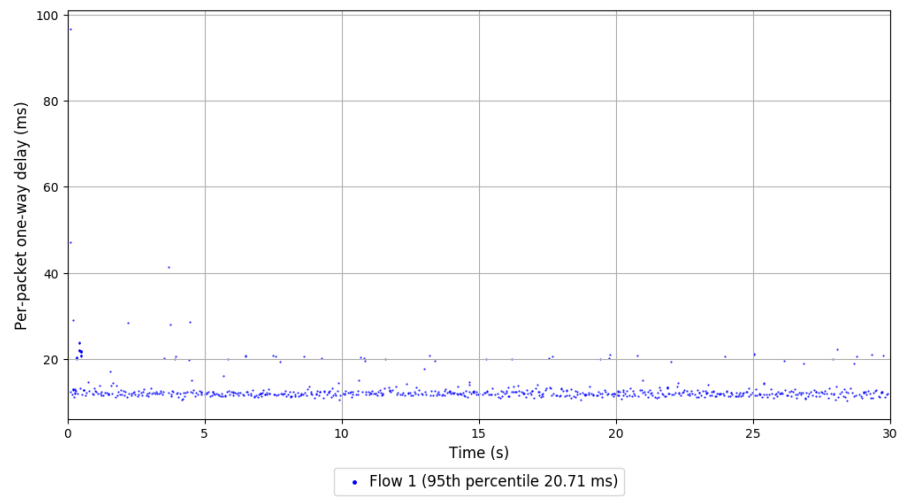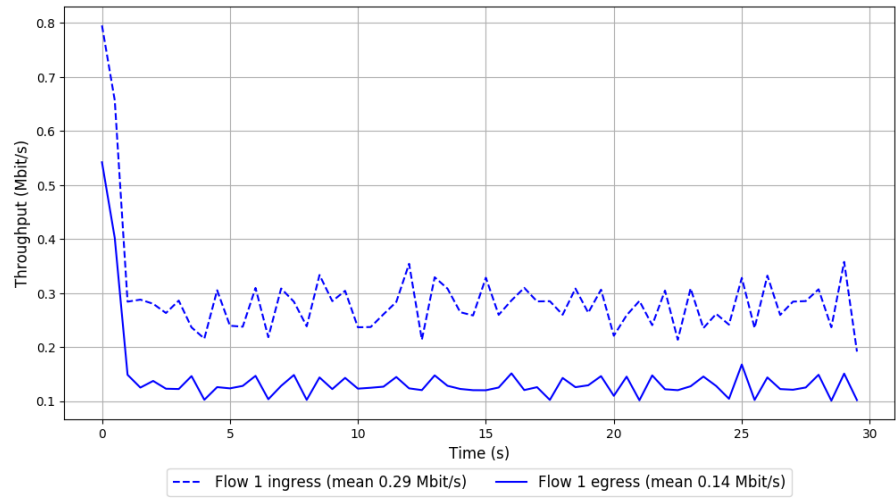Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-04-03 01:40:54
End at: 2018-04-03 01:41:24
Local clock offset: -1.147 ms
Remote clock offset: -6.256 ms


# Below is generated by plot.py at 2018-04-03 01:59:19
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.708 ms
Loss rate: 51.92%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.708 ms
Loss rate: 51.92%
```

Run 3: Report of Sprout — Data Link

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

Start at: 2018-04-03 01:10:53
End at: 2018-04-03 01:11:23
Local clock offset: -3.524 ms
Remote clock offset: -5.2 ms

# Below is generated by plot.py at 2018-04-03 01:59:22
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 30.762 ms
Loss rate: 93.37%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 30.762 ms
Loss rate: 93.37%
```
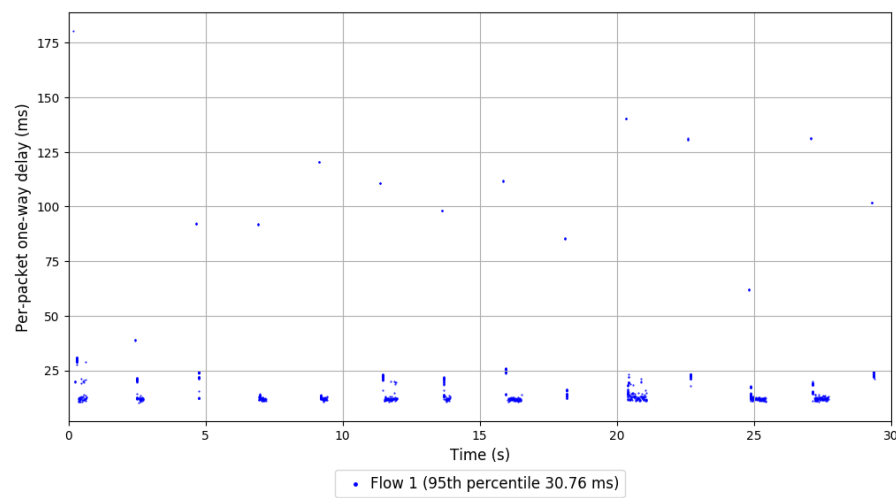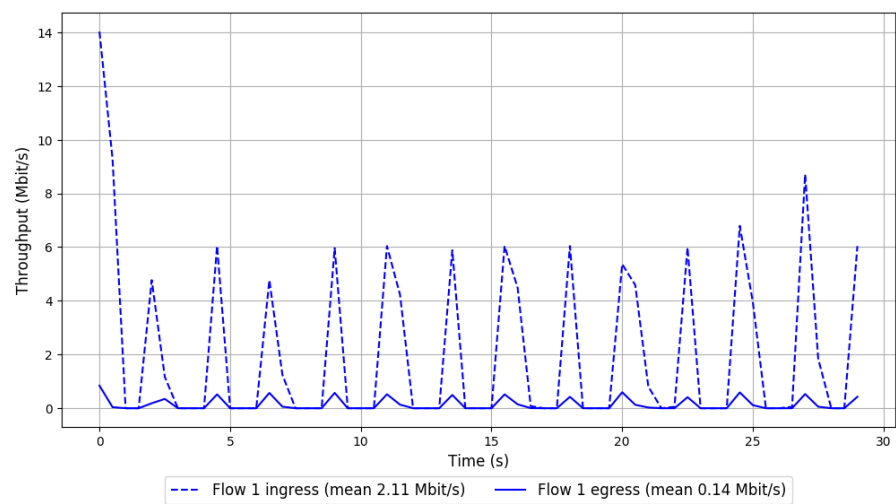
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 2.11 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)

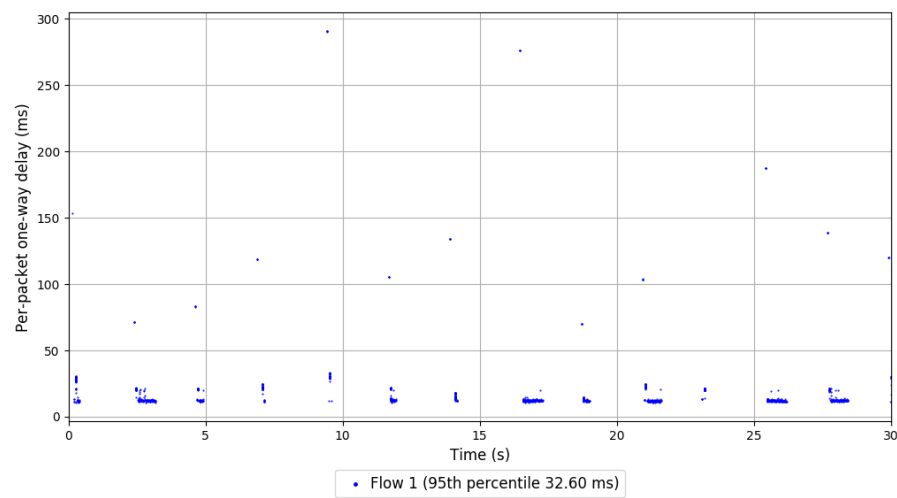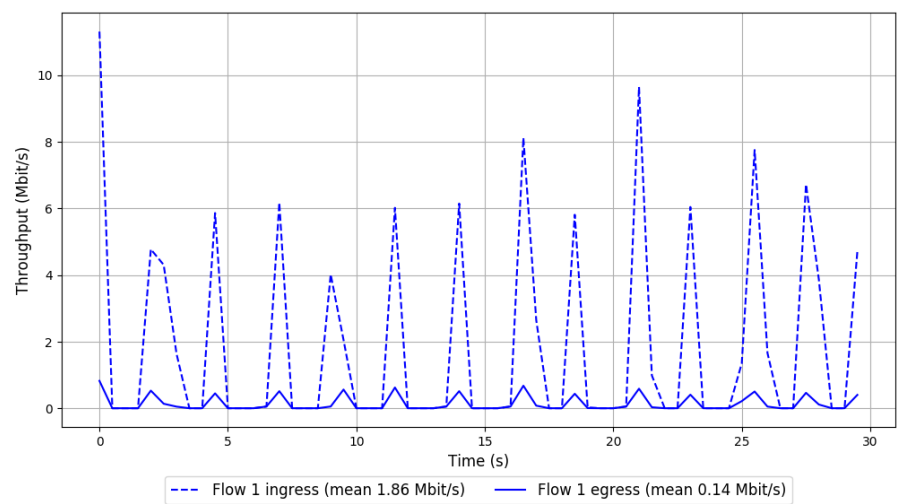Flow 1 (95th percentile 30.76 ms)

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

Start at: 2018-04-03 01:34:23
End at: 2018-04-03 01:34:53
Local clock offset: -1.342 ms
Remote clock offset: -5.914 ms


# Below is generated by plot.py at 2018-04-03 01:59:23
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 32.596 ms
Loss rate: 92.49%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 32.596 ms
Loss rate: 92.49%
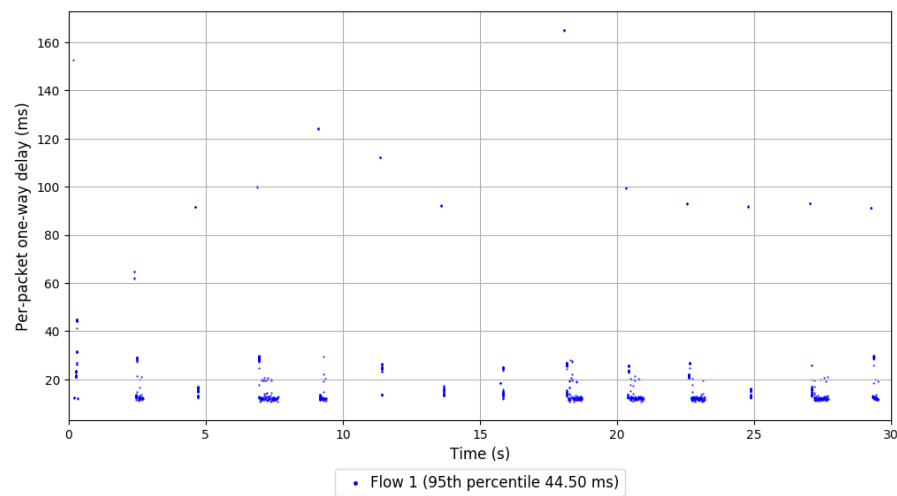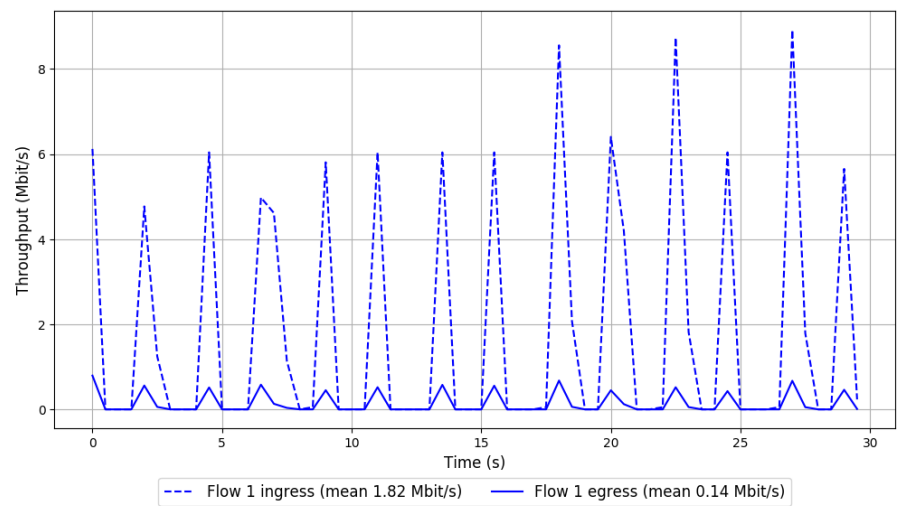```

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

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

Start at: 2018-04-03 01:57:52
End at: 2018-04-03 01:58:22
Local clock offset: -0.488 ms
Remote clock offset: -6.541 ms


# Below is generated by plot.py at 2018-04-03 01:59:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 44.500 ms
Loss rate: 92.29%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 44.500 ms
Loss rate: 92.29%
```

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

Flow 1 ingress (mean 1.82 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

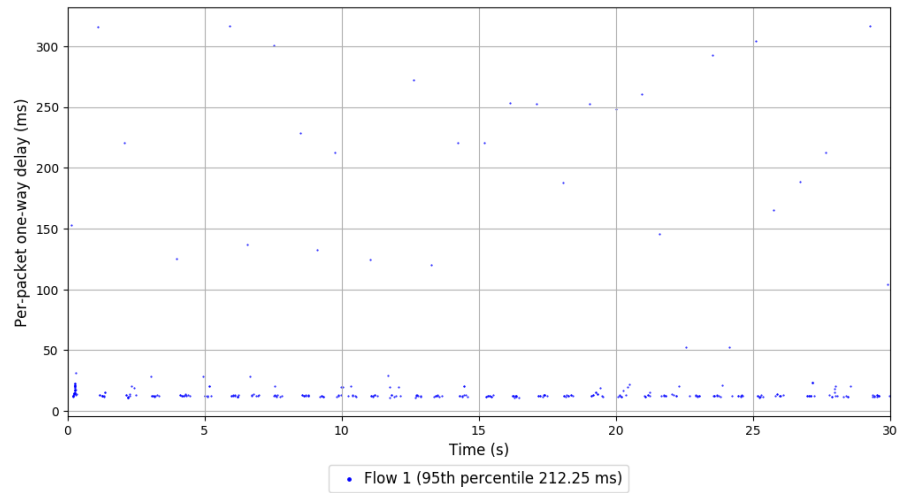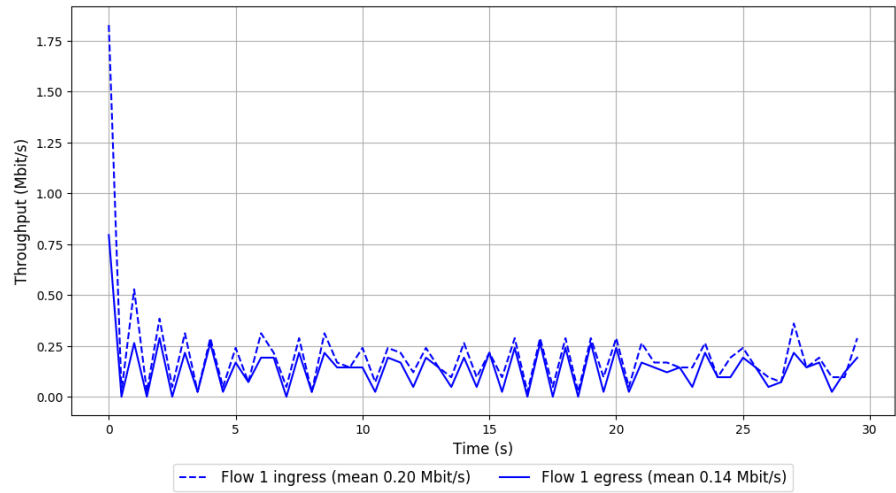

Flow 1 (95th percentile 44.50 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2018-04-03 01:08:17
End at: 2018-04-03 01:08:47
Local clock offset: -3.438 ms
Remote clock offset: -5.272 ms


# Below is generated by plot.py at 2018-04-03 01:59:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 212.246 ms
Loss rate: 31.82%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 212.246 ms
Loss rate: 31.82%
```

Run 1: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 0.20 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)

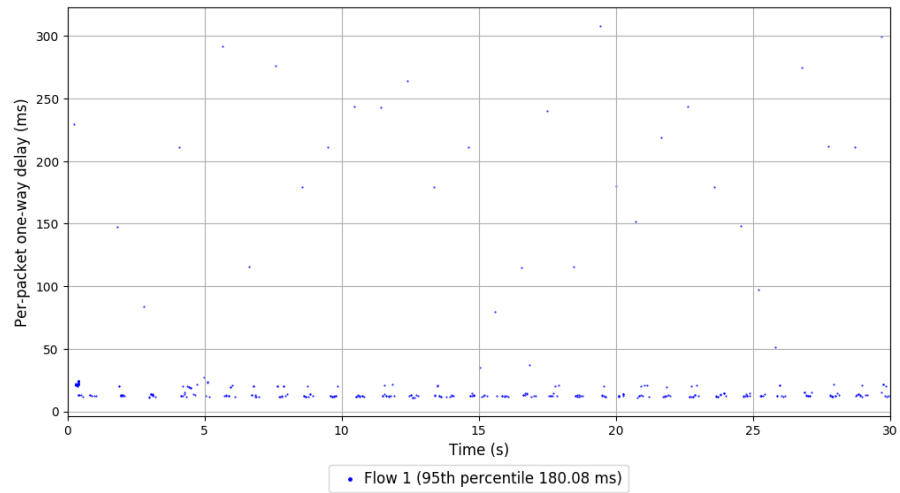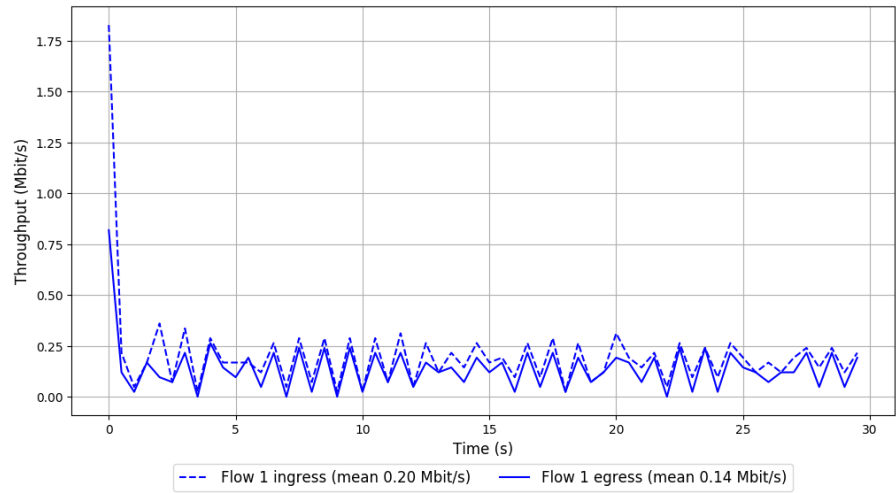
Flow 1 (95th percentile 212.25 ms)

```
Run 2: Statistics of TCP Vegas

Start at: 2018-04-03 01:31:46
End at: 2018-04-03 01:32:16
Local clock offset: -1.393 ms
Remote clock offset: -5.906 ms


# Below is generated by plot.py at 2018-04-03 01:59:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 180.081 ms
Loss rate: 31.49%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 180.081 ms
Loss rate: 31.49%
```
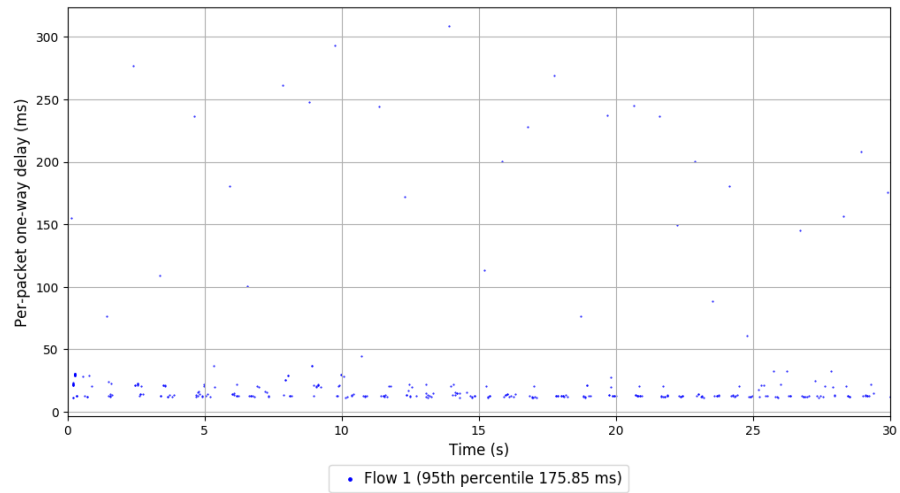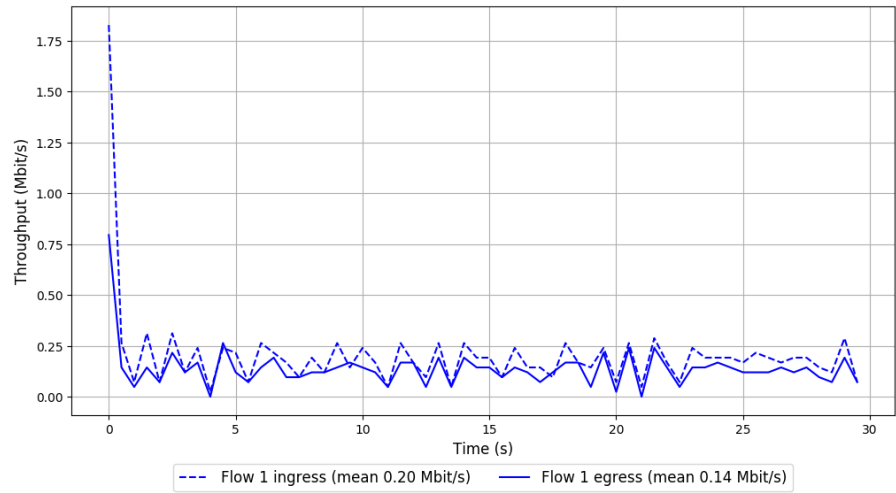
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2018-04-03 01:55:16
End at: 2018-04-03 01:55:46
Local clock offset: -0.736 ms
Remote clock offset: -6.576 ms


# Below is generated by plot.py at 2018-04-03 01:59:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 175.855 ms
Loss rate: 31.88%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 175.855 ms
Loss rate: 31.88%
```
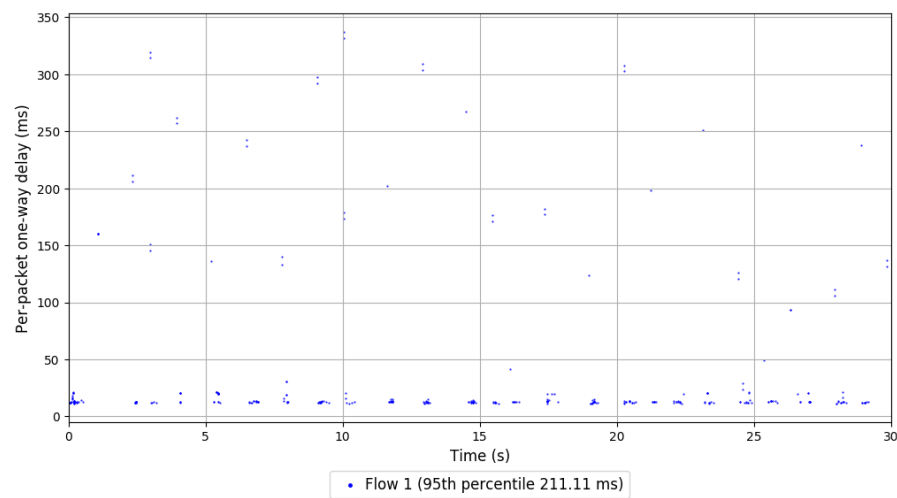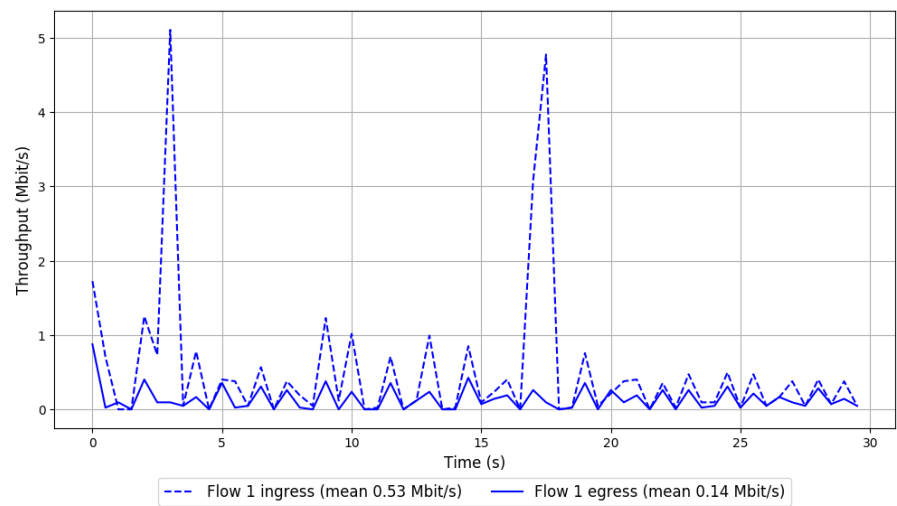
Run 3: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: 2018-04-03 00:56:32
End at: 2018-04-03 00:57:02
Local clock offset: -4.466 ms
Remote clock offset: -4.974 ms


# Below is generated by plot.py at 2018-04-03 01:59:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 211.111 ms
Loss rate: 73.66%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 211.111 ms
Loss rate: 73.66%
```
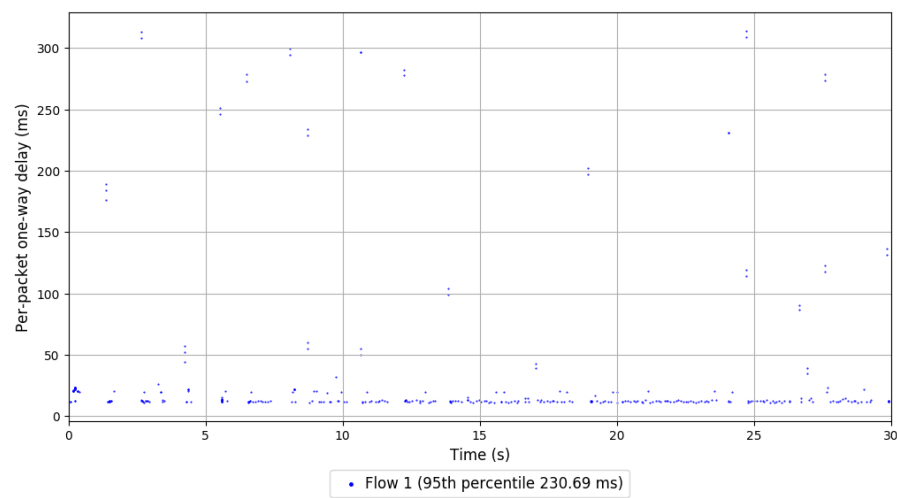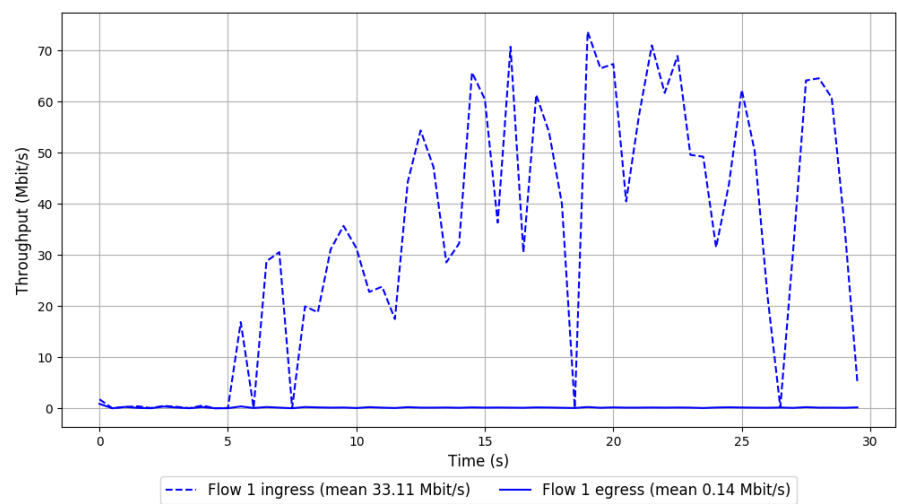
Run 1: Report of Verus — Data Link

```
Run 2: Statistics of Verus

Start at: 2018-04-03 01:20:01
End at: 2018-04-03 01:20:31
Local clock offset: -2.942 ms
Remote clock offset: -5.331 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 230.689 ms
Loss rate: 99.58%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 230.689 ms
Loss rate: 99.58%
```
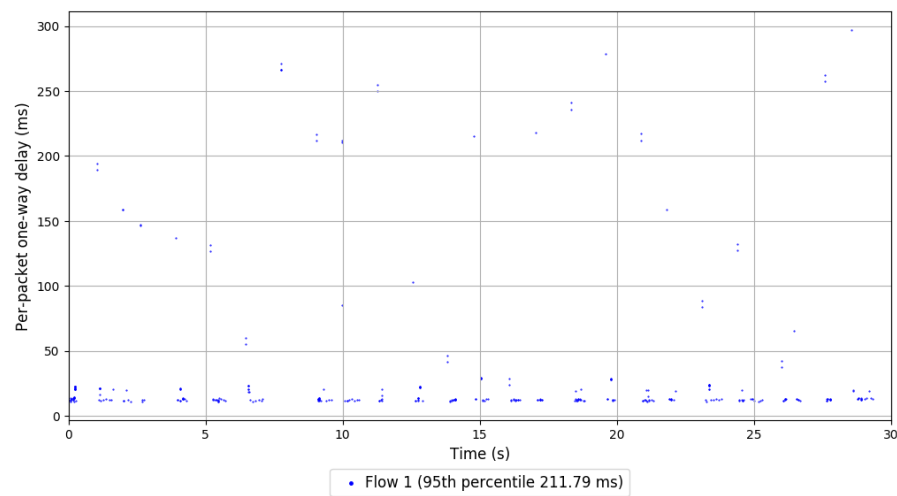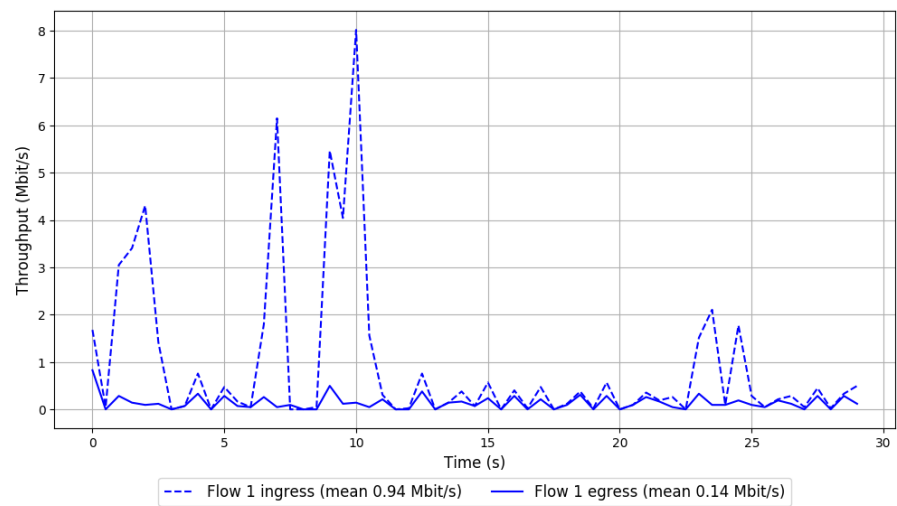
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-04-03 01:43:31
End at: 2018-04-03 01:44:01
Local clock offset: -1.208 ms
Remote clock offset: -6.278 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 211.786 ms
Loss rate: 85.03%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 211.786 ms
Loss rate: 85.03%
```

Run 3: Report of Verus — Data Link

Flow 1 ingress (mean 0.94 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

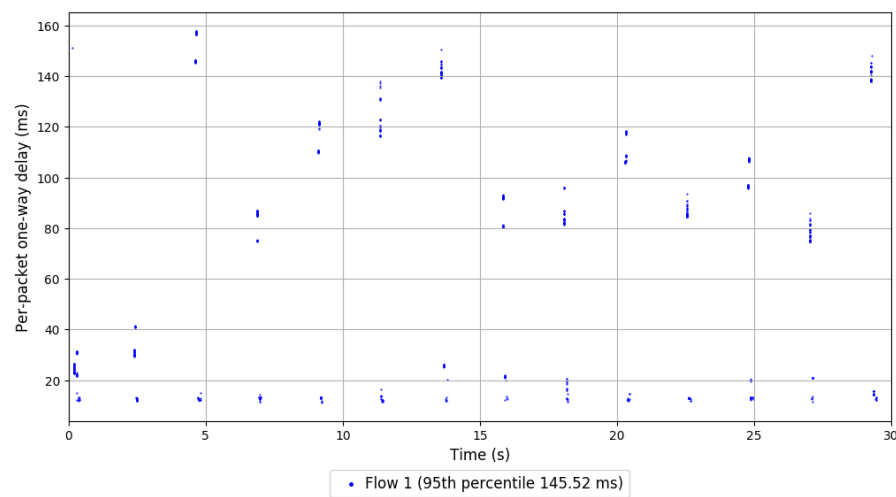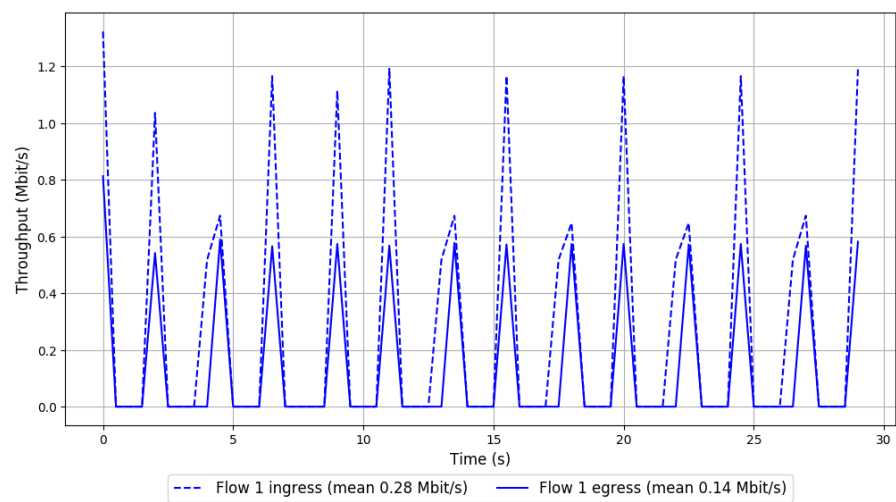Flow 1 (95th percentile 211.79 ms)

```
Run 1: Statistics of Copa

Start at: 2018-04-03 00:52:38
End at: 2018-04-03 00:53:08
Local clock offset: -6.126 ms
Remote clock offset: -4.839 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 145.522 ms
Loss rate: 49.81%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 145.522 ms
Loss rate: 49.81%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 0.28 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)
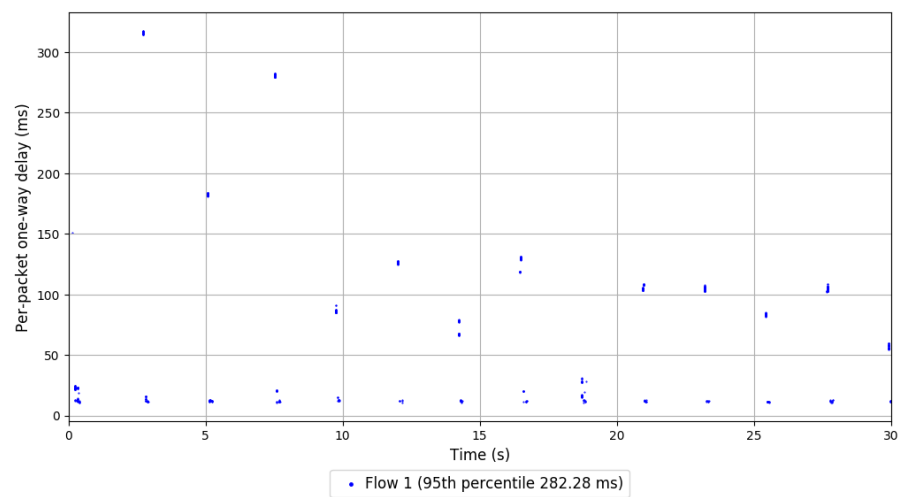

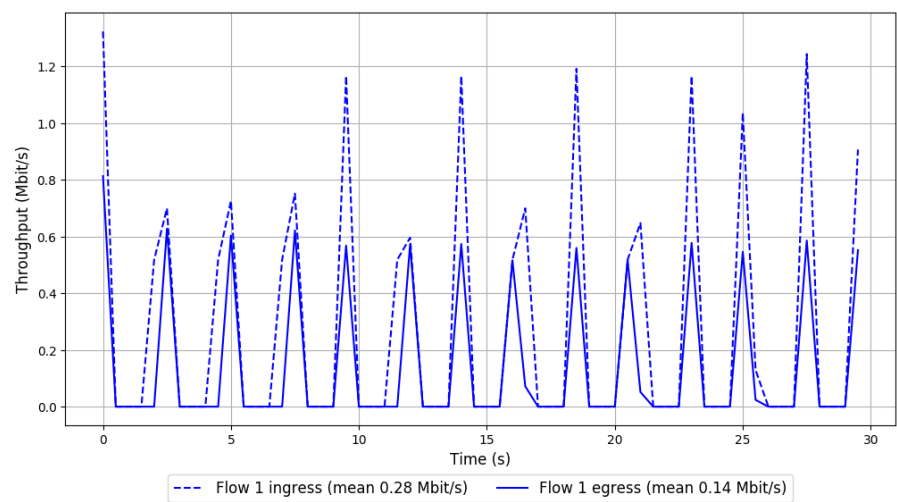Flow 1 (95th percentile 145.52 ms)

Run 2: Statistics of Copa

Start at: 2018-04-03 01:16:06
End at: 2018-04-03 01:16:36
Local clock offset: -3.811 ms
Remote clock offset: -5.322 ms

Below is generated by plot.py at 2018-04-03 01:59:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 282.280 ms
Loss rate: 49.37%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 282.280 ms
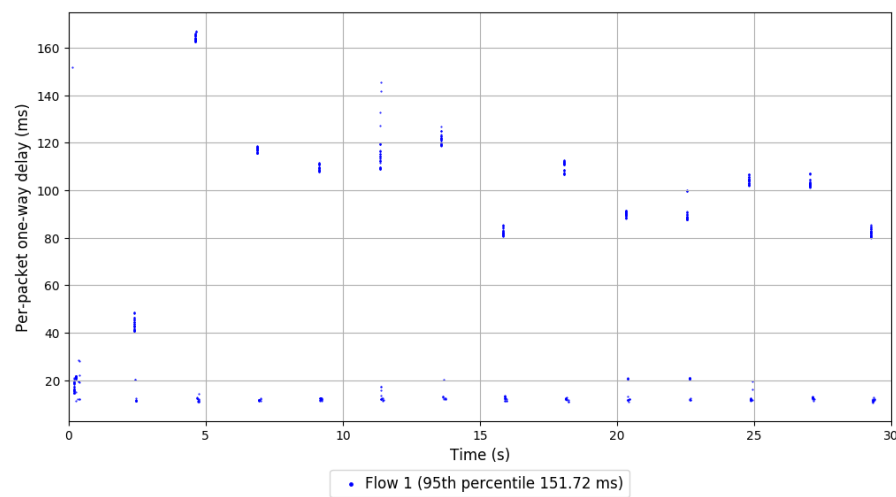Loss rate: 49.37%
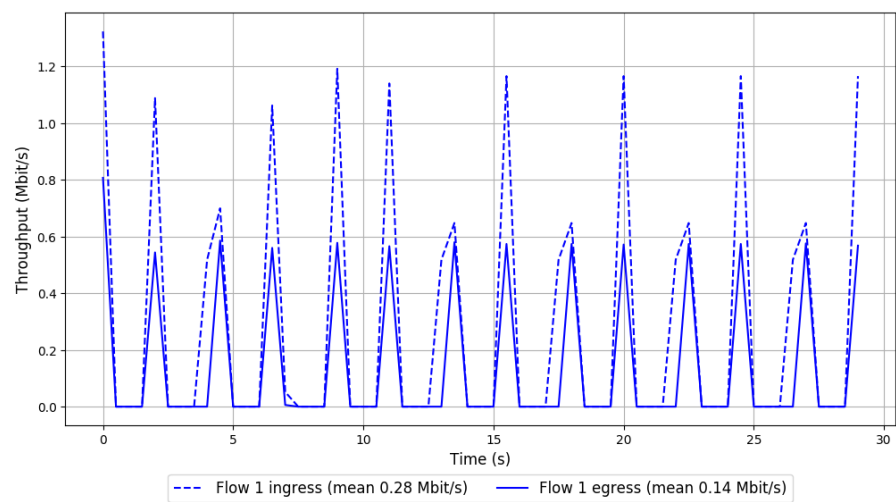
Run 2: Report of Copa — Data Link

Flow 1 ingress (mean 0.28 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 282.28 ms)

```
Run 3: Statistics of Copa

Start at: 2018-04-03 01:39:36
End at: 2018-04-03 01:40:06
Local clock offset: -1.239 ms
Remote clock offset: -6.219 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 151.717 ms
Loss rate: 49.78%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 151.717 ms
Loss rate: 49.78%
```

Run 3: Report of Copa — Data Link

Flow 1 ingress (mean 0.28 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

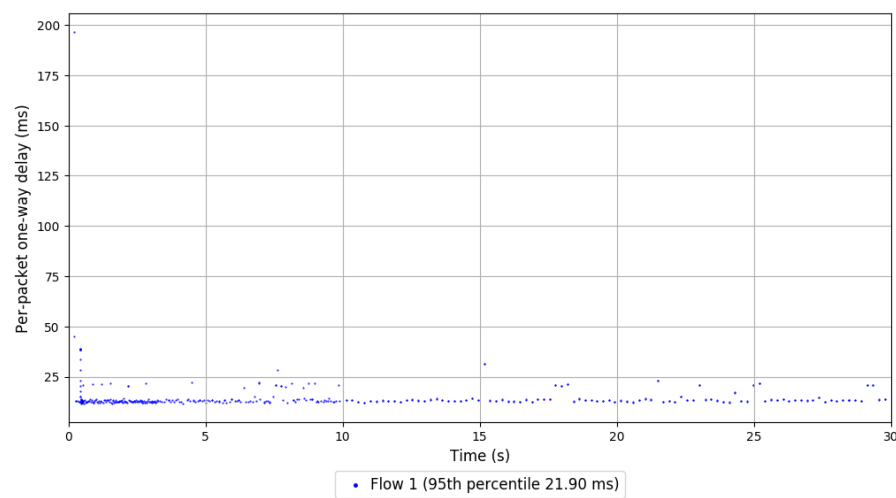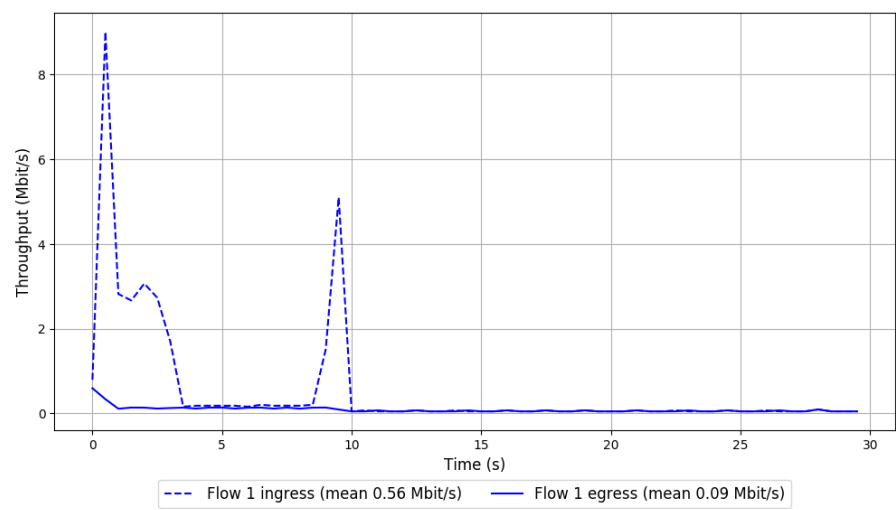Flow 1 (95th percentile 151.72 ms)

```
Run 1: Statistics of FillP

Start at: 2018-04-03 00:48:43
End at: 2018-04-03 00:49:13
Local clock offset: -8.731 ms
Remote clock offset: -4.776 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 21.897 ms
Loss rate: 83.93%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 21.897 ms
Loss rate: 83.93%
```

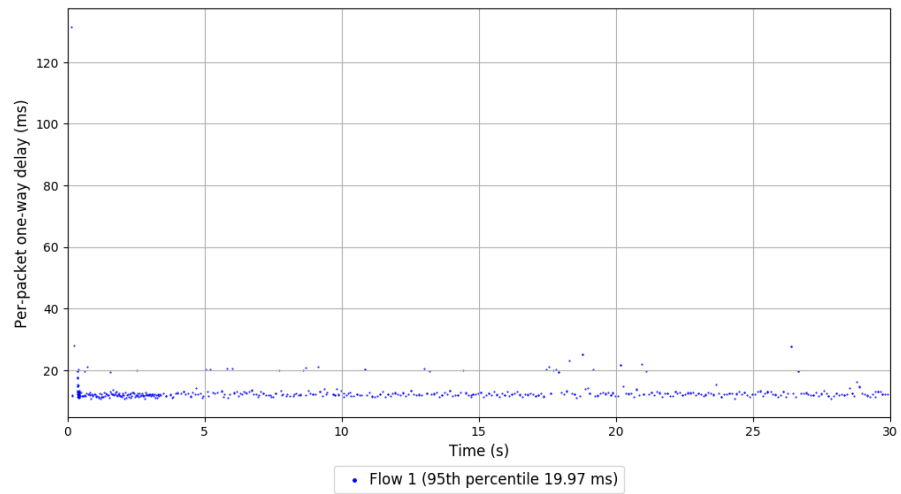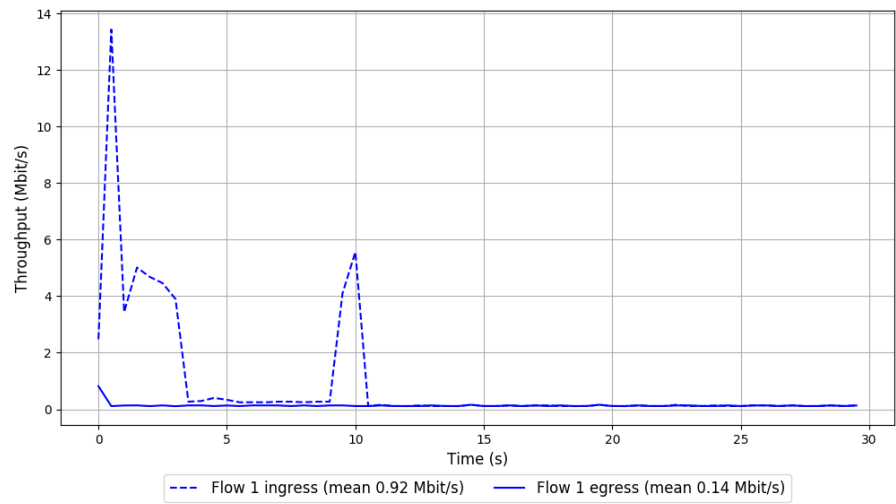Run 1: Report of FillP — Data Link

```
Run 2: Statistics of FillP

Start at: 2018-04-03 01:12:11
End at: 2018-04-03 01:12:41
Local clock offset: -3.621 ms
Remote clock offset: -5.318 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.972 ms
Loss rate: 85.17%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.972 ms
Loss rate: 85.17%
```
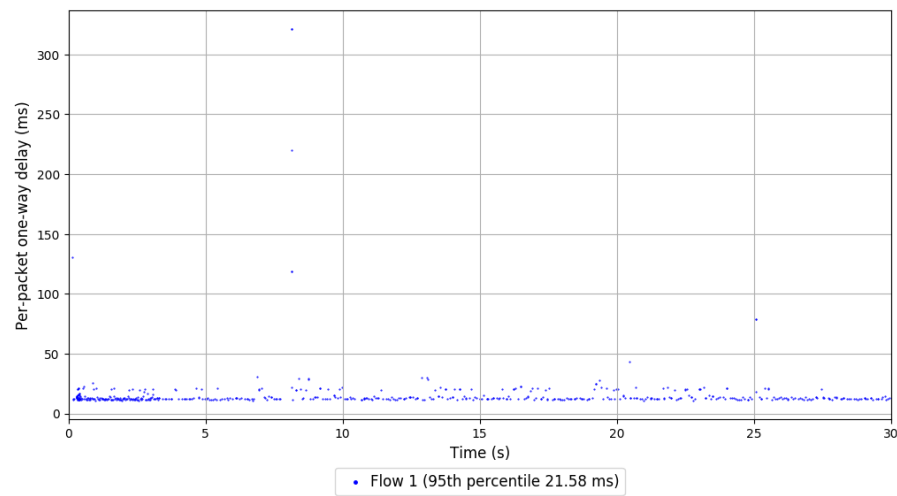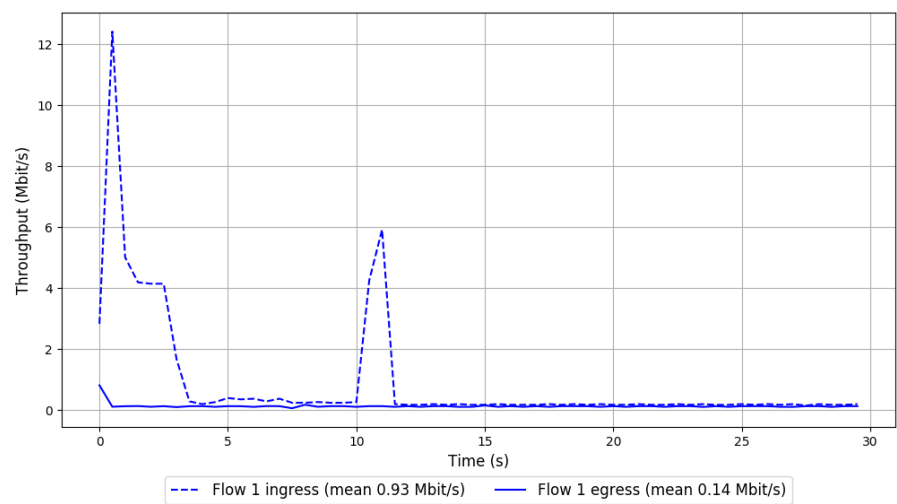
Run 2: Report of FillP — Data Link

```
Run 3: Statistics of FillP

Start at: 2018-04-03 01:35:41
End at: 2018-04-03 01:36:11
Local clock offset: -1.257 ms
Remote clock offset: -6.042 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.583 ms
Loss rate: 84.98%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 21.583 ms
Loss rate: 84.98%
```

Run 3: Report of FillP — Data Link

Flow 1 ingress (mean 0.93 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

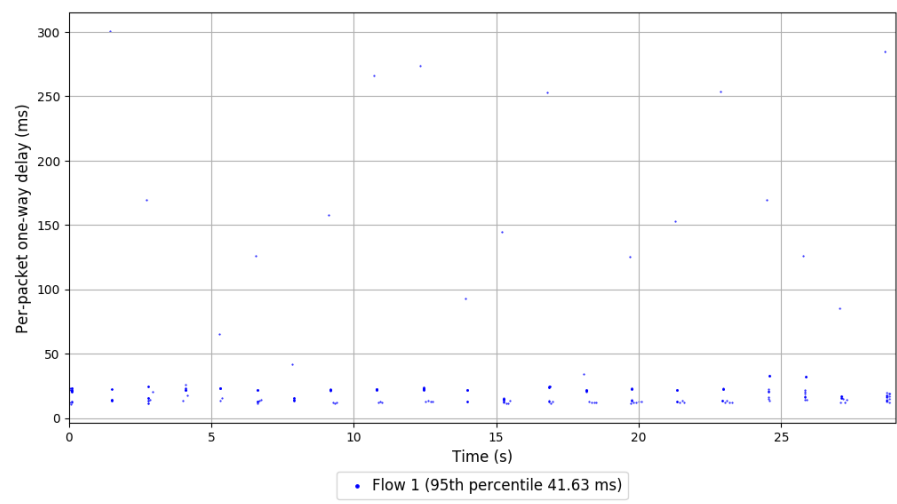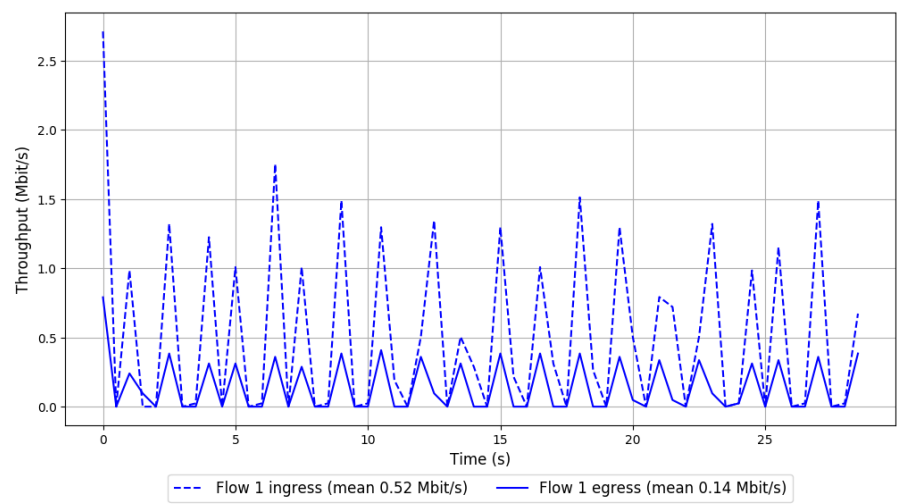Flow 1 (95th percentile 21.58 ms)

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

Start at: 2018-04-03 00:59:09
End at: 2018-04-03 00:59:39
Local clock offset: -3.872 ms
Remote clock offset: -5.049 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 41.627 ms
Loss rate: 72.73%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 41.627 ms
Loss rate: 72.73%
```

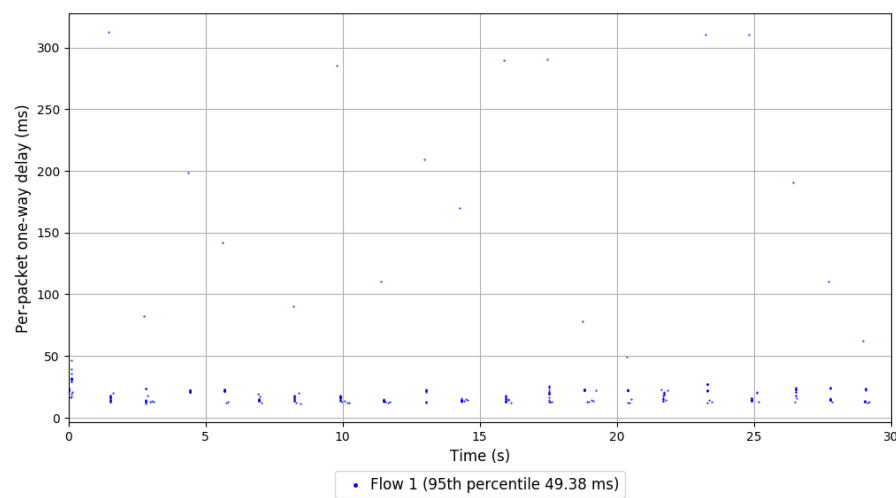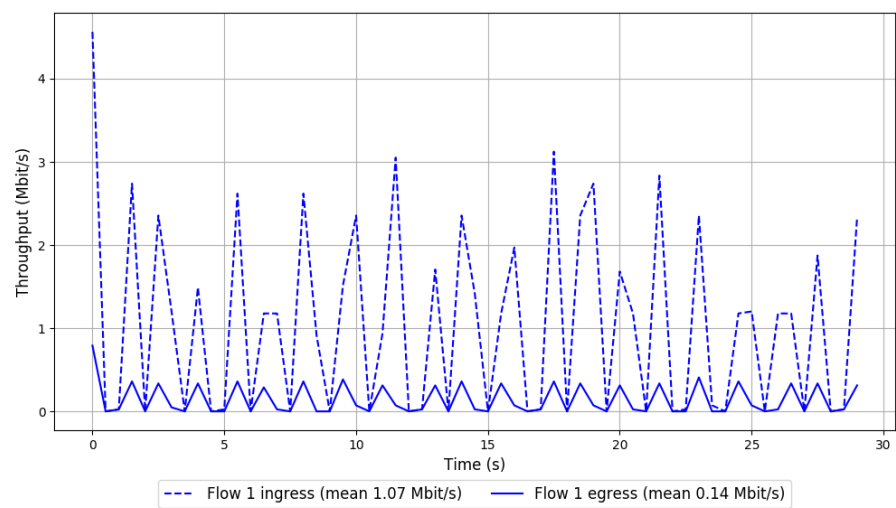# Run 1: Report of Indigo-1-32 — Data Link

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

Start at: 2018-04-03 01:22:38
End at: 2018-04-03 01:23:08
Local clock offset: -2.257 ms
Remote clock offset: -5.259 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 49.378 ms
Loss rate: 86.87%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 49.378 ms
Loss rate: 86.87%
```

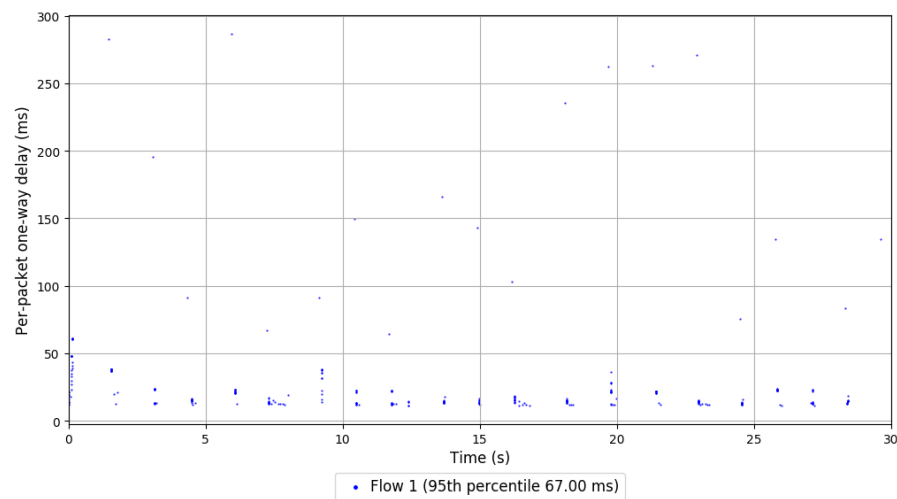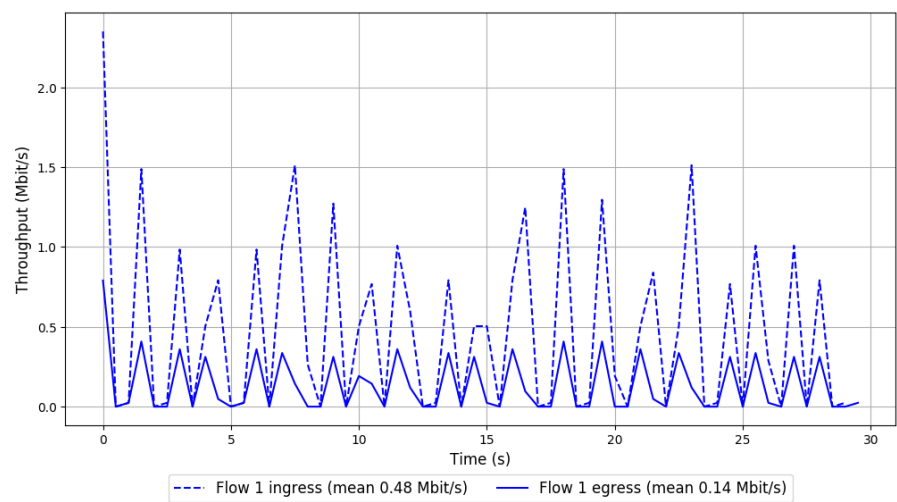Run 2: Report of Indigo-1-32 — Data Link

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

Start at: 2018-04-03 01:46:08
End at: 2018-04-03 01:46:38
Local clock offset: -1.111 ms
Remote clock offset: -6.382 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 67.002 ms
Loss rate: 71.48%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 67.002 ms
Loss rate: 71.48%
```

Run 3: Report of Indigo-1-32 — Data Link

Flow 1 ingress (mean 0.48 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

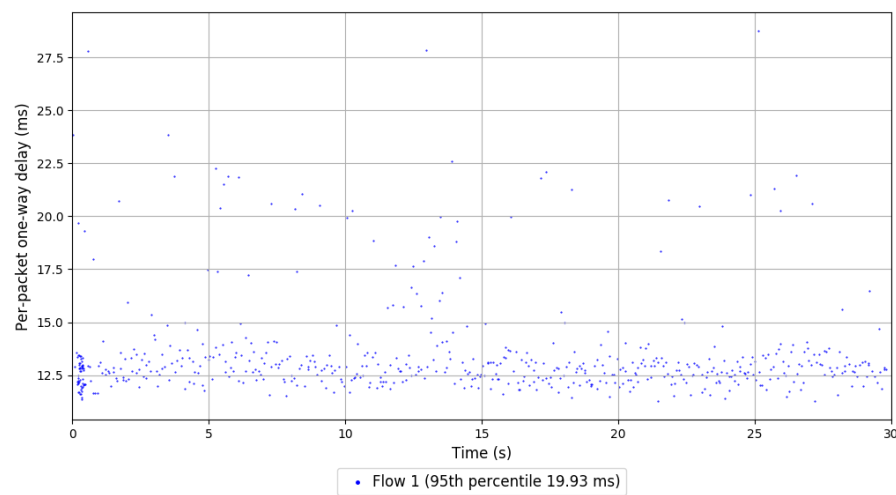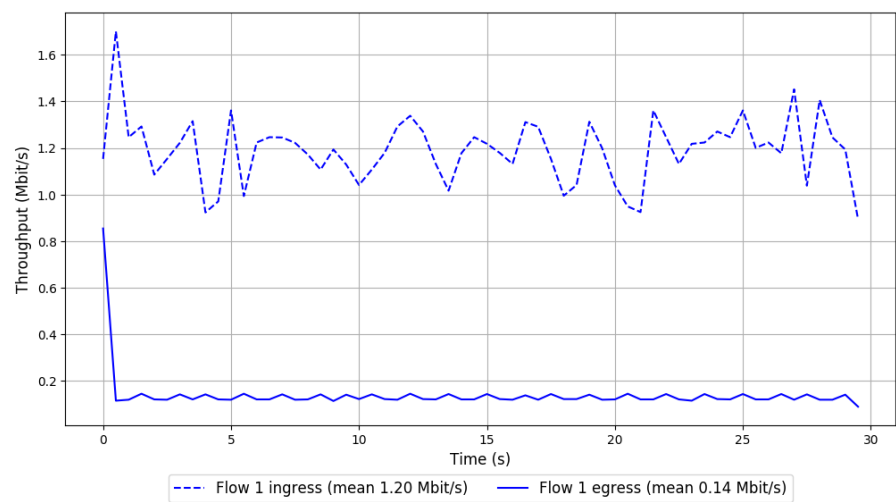

• Flow 1 (95th percentile 67.00 ms)

```
Run 1: Statistics of Vivace-latency

Start at: 2018-04-03 00:51:20
End at: 2018-04-03 00:51:50
Local clock offset: -6.713 ms
Remote clock offset: -4.819 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.925 ms
Loss rate: 88.29%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.925 ms
Loss rate: 88.29%
```

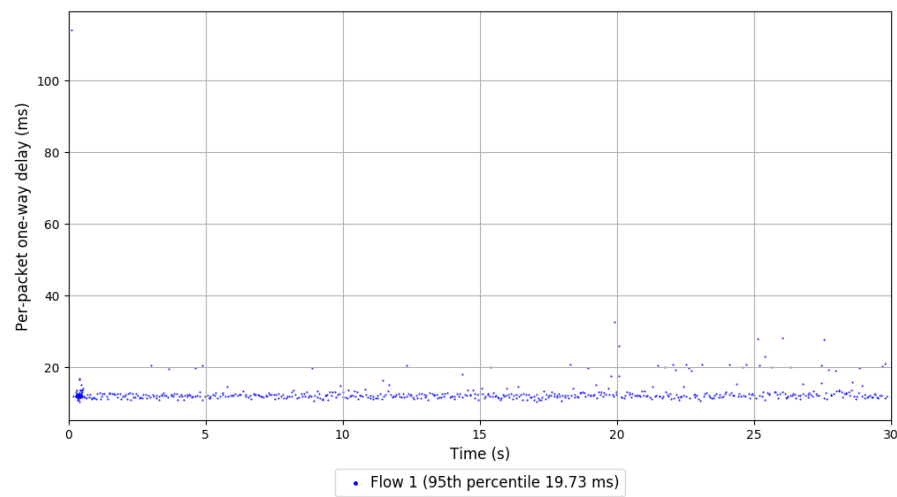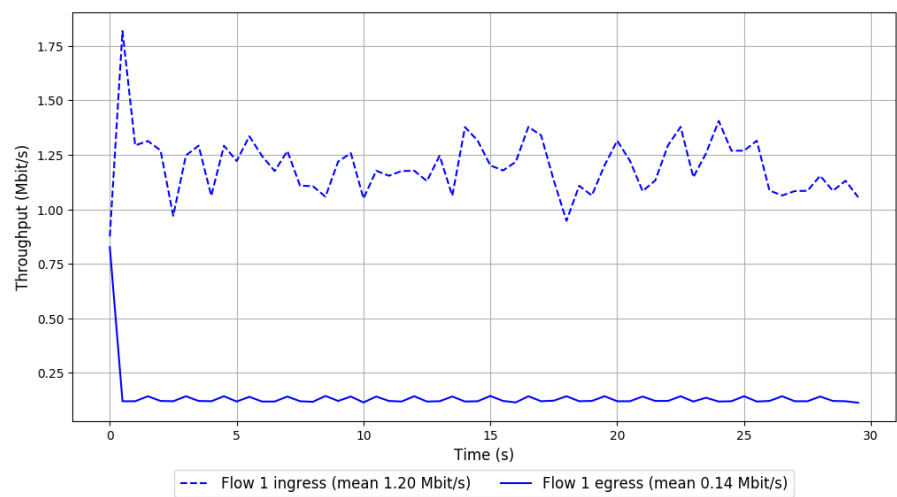Run 1: Report of Vivace-latency — Data Link

```
Run 2: Statistics of Vivace-latency

Start at: 2018-04-03 01:14:48
End at: 2018-04-03 01:15:18
Local clock offset: -3.79 ms
Remote clock offset: -5.232 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.730 ms
Loss rate: 88.39%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.730 ms
Loss rate: 88.39%
```

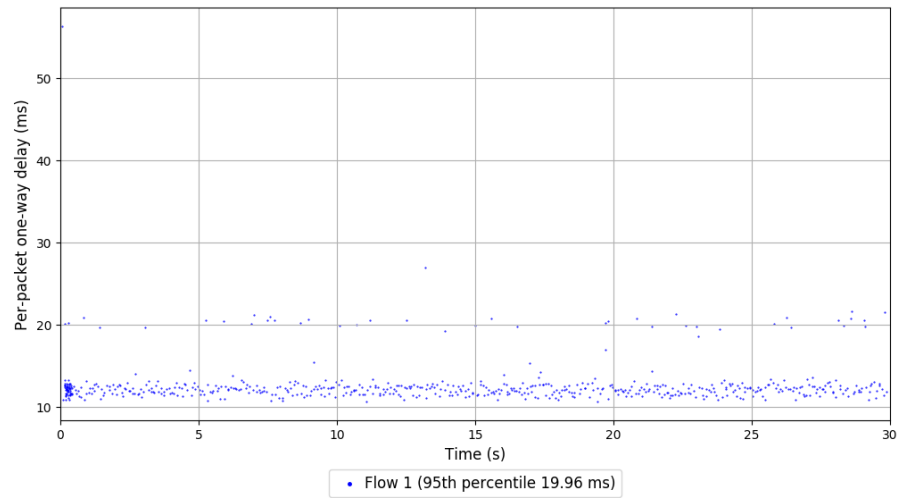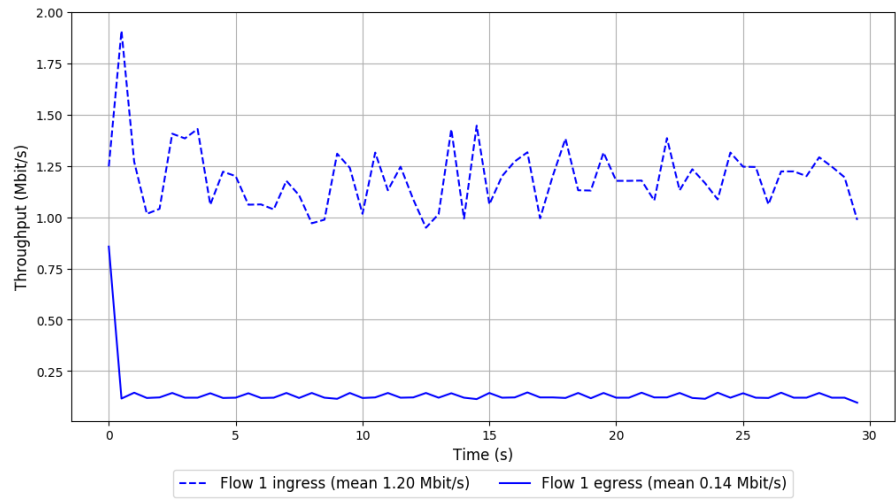Run 2: Report of Vivace-latency — Data Link

```
Run 3: Statistics of Vivace-latency

Start at: 2018-04-03 01:38:18
End at: 2018-04-03 01:38:48
Local clock offset: -1.244 ms
Remote clock offset: -6.147 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.962 ms
Loss rate: 88.32%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.962 ms
Loss rate: 88.32%
```

Run 3: Report of Vivace-latency — Data Link

Flow 1 ingress (mean 1.20 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)
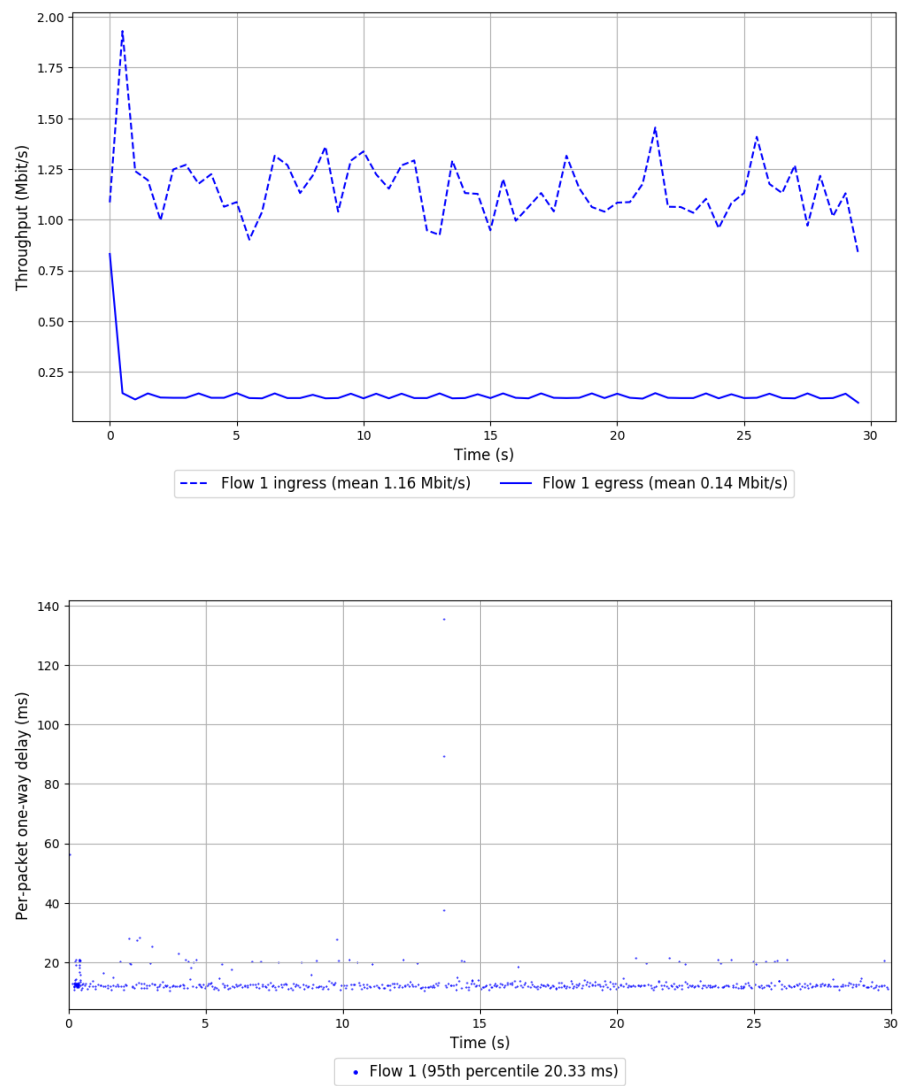

Flow 1 (95th percentile 19.96 ms)

```
Run 1: Statistics of Vivace-loss

Start at: 2018-04-03 01:09:35
End at: 2018-04-03 01:10:05
Local clock offset: -3.391 ms
Remote clock offset: -5.287 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.326 ms
Loss rate: 87.90%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.326 ms
Loss rate: 87.90%
```

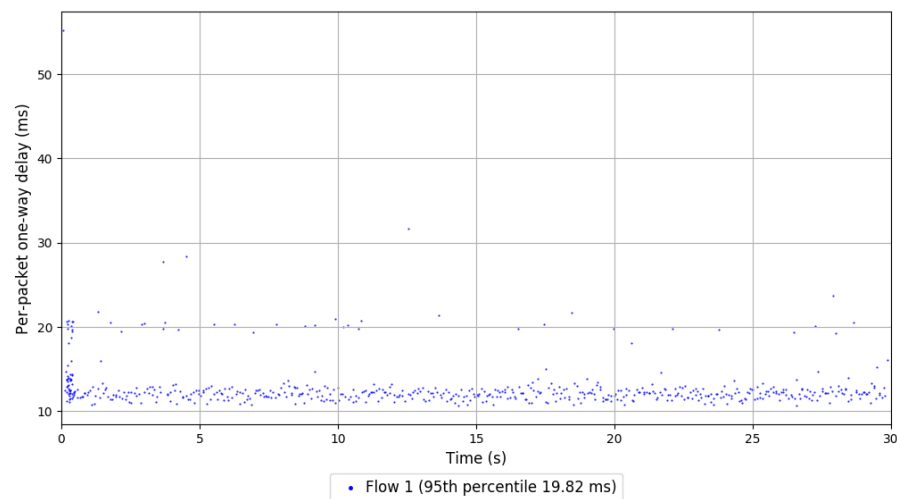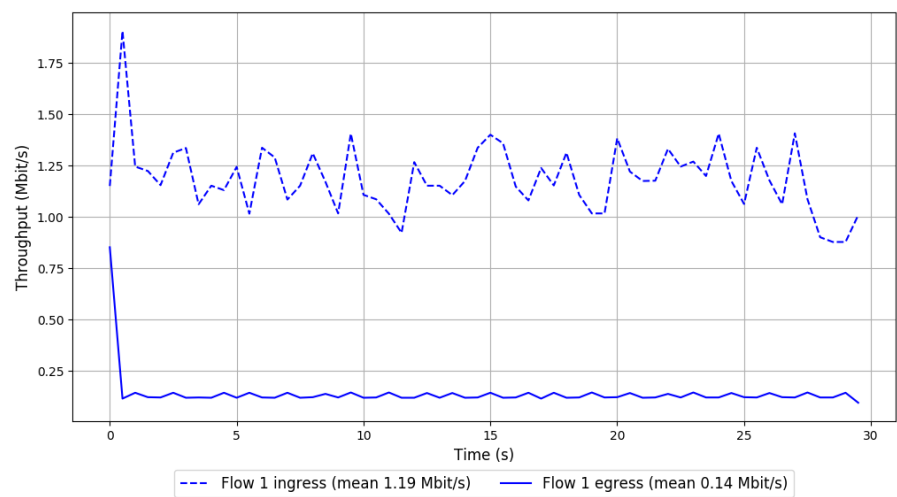Run 1: Report of Vivace-loss — Data Link

```
Run 2: Statistics of Vivace-loss

Start at: 2018-04-03 01:33:04
End at: 2018-04-03 01:33:34
Local clock offset: -1.349 ms
Remote clock offset: -5.945 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.822 ms
Loss rate: 88.26%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.822 ms
Loss rate: 88.26%
```

Run 2: Report of Vivace-loss — Data Link

```
Run 3: Statistics of Vivace-loss

Start at: 2018-04-03 01:56:34
End at: 2018-04-03 01:57:04
Local clock offset: -0.539 ms
Remote clock offset: -6.52 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.826 ms
Loss rate: 88.01%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.826 ms
Loss rate: 88.01%
```
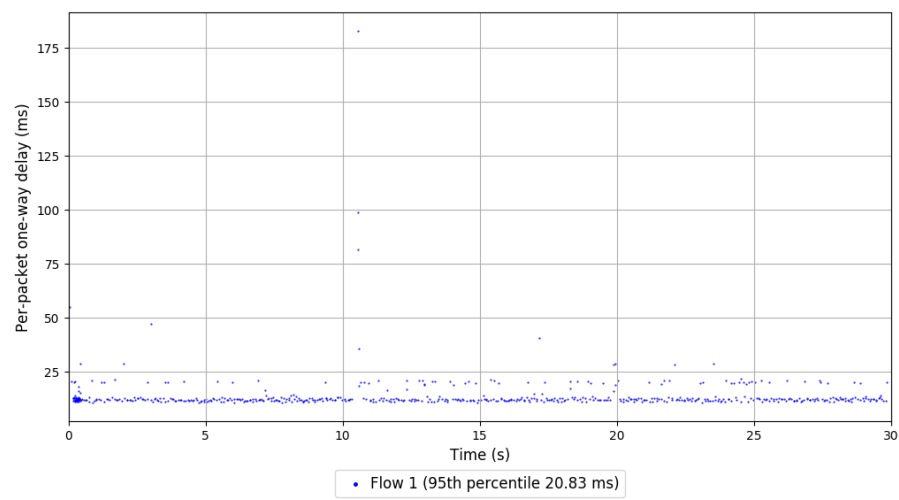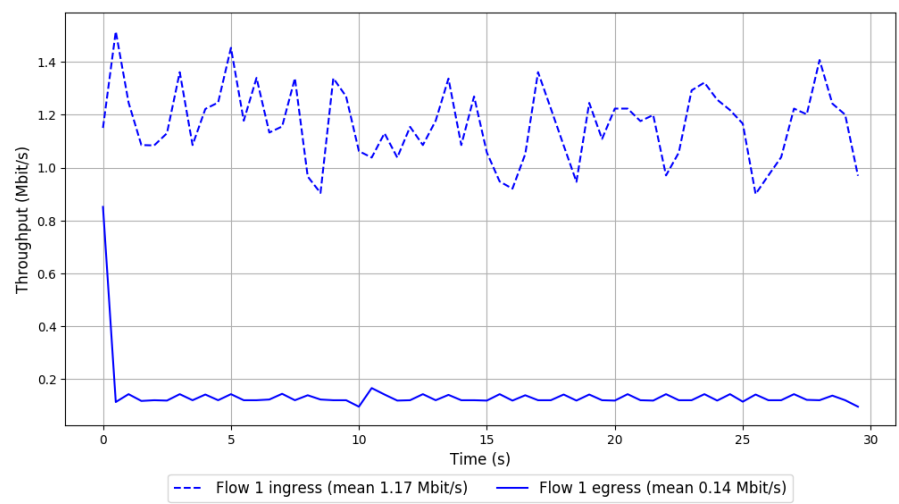
Run 3: Report of Vivace-loss — Data Link

Flow 1 ingress (mean 1.17 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 20.83 ms)

```
Run 1: Statistics of Vivace-LTE

Start at: 2018-04-03 01:00:28
End at: 2018-04-03 01:00:58
Local clock offset: -3.74 ms
Remote clock offset: -5.168 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.931 ms
Loss rate: 88.38%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 19.931 ms
Loss rate: 88.38%
```
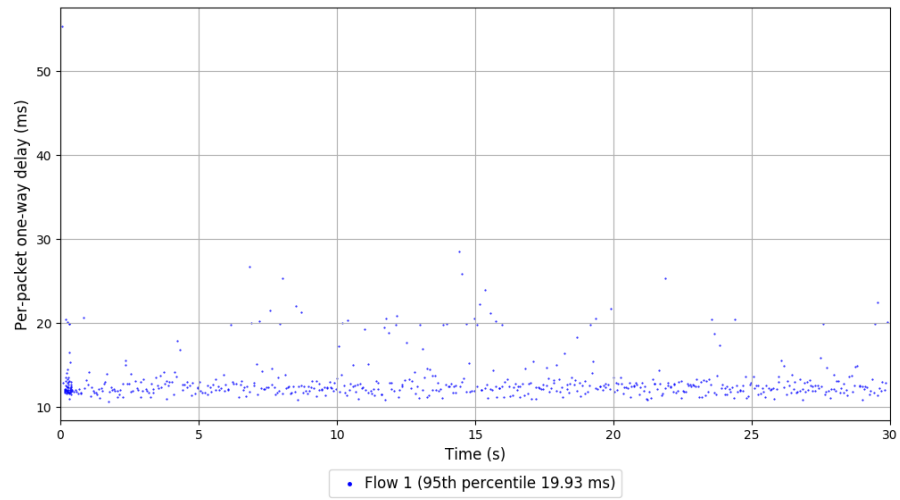
Run 1: Report of Vivace-LTE — Data Link

Flow 1 ingress (mean 1.21 Mbit/s) --- Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 19.93 ms)

```
Run 2: Statistics of Vivace-LTE

Start at: 2018-04-03 01:23:56
End at: 2018-04-03 01:24:26
Local clock offset: -2.136 ms
Remote clock offset: -5.35 ms

# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.131 ms
Loss rate: 88.33%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 20.131 ms
Loss rate: 88.33%
```
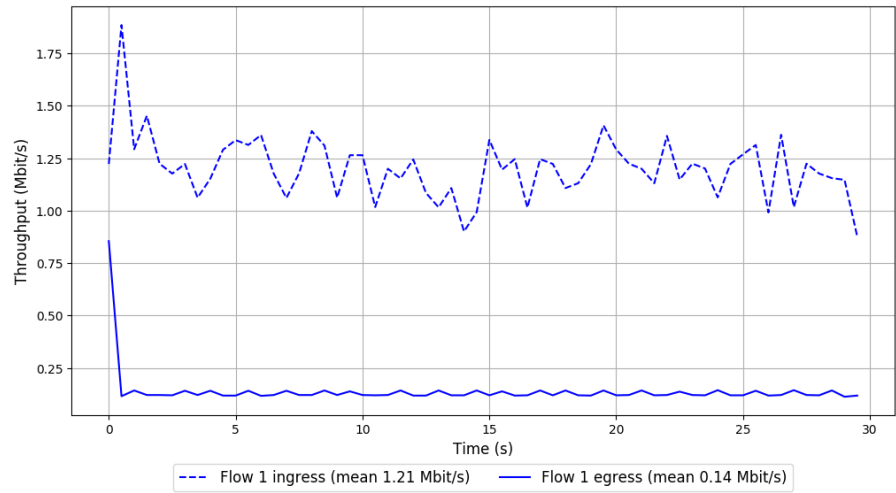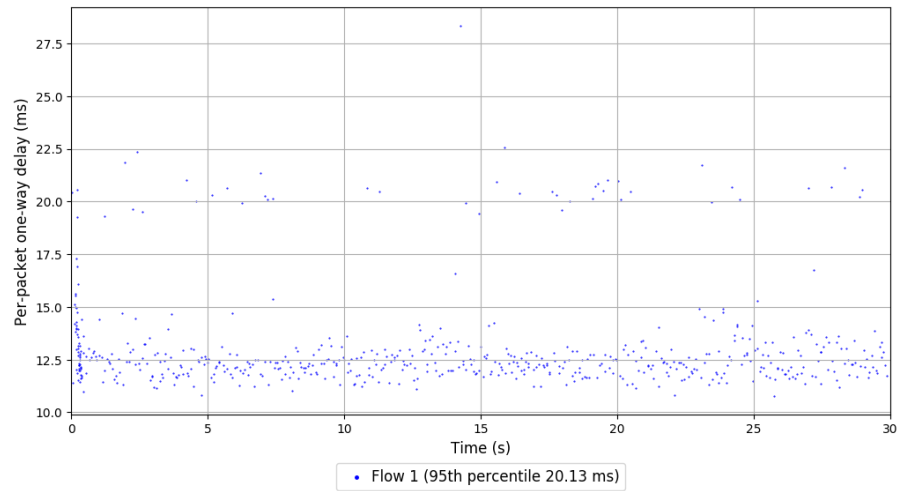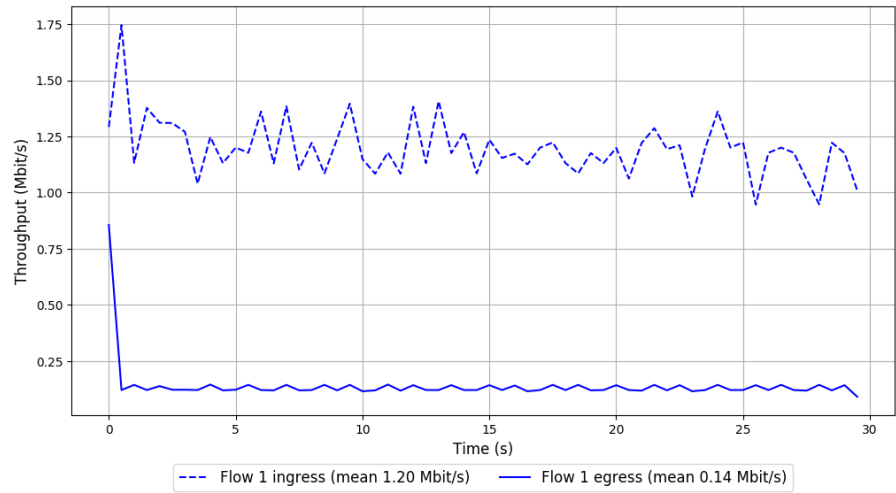
Run 2: Report of Vivace-LTE — Data Link

```
Run 3: Statistics of Vivace-LTE

Start at: 2018-04-03 01:47:26
End at: 2018-04-03 01:47:56
Local clock offset: -1.136 ms
Remote clock offset: -6.41 ms


# Below is generated by plot.py at 2018-04-03 01:59:35
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 13.699 ms
Loss rate: 88.14%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 13.699 ms
Loss rate: 88.14%
```

Run 3: Report of Vivace-LTE — Data Link

Flow 1 ingress (mean 1.18 Mbit/s)   Flow 1 egress (mean 0.14 Mbit/s)

Flow 1 (95th percentile 13.70 ms)