Pantheon Report

Generated at 2018-04-16 22:38:31 (UTC).

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

Repeated the test of 16 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
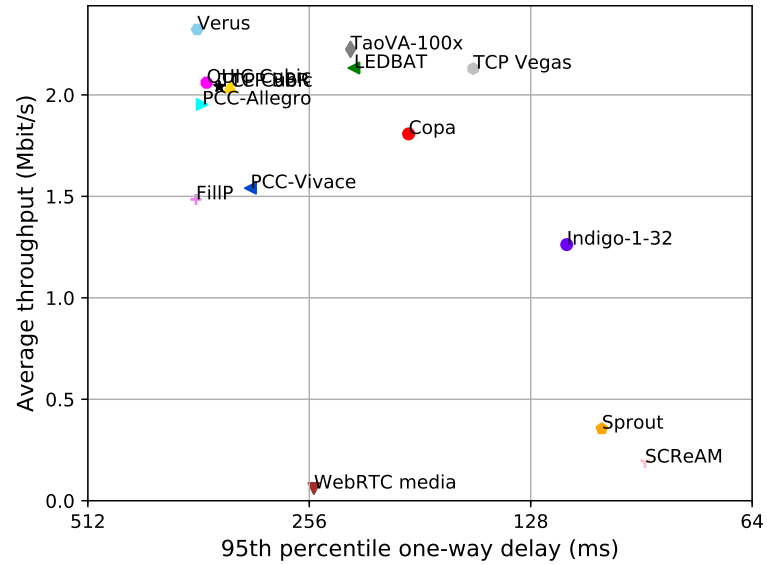
Tested BBR with qdisc of Fair Queuing (`fq`), and other schemes with the default Linux qdisc (`pfifo_fast`).

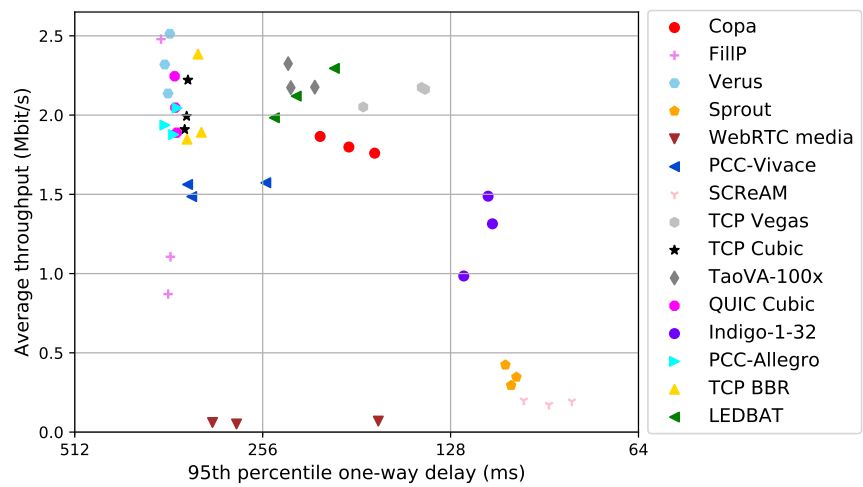NTP offsets were measured against `nets.org.sg` and have been applied to correct the timestamps in logs.

```
Git summary:
branch: master @ 4ed32c0e22b4dd733f97c1d3aaab2e5bb16f66b4
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/fillp @ 11f8c46a2bf1dc797253db7e8ca04076272b2a44
third_party/genericCC @ d223989828276fa83a807da6e0341dc0c7b89aec
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/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
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 India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme
(mean of all runs by scheme)

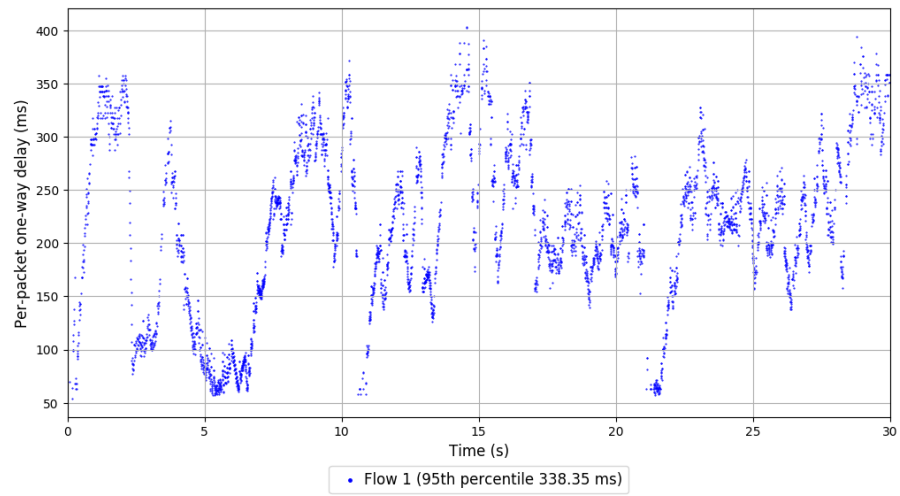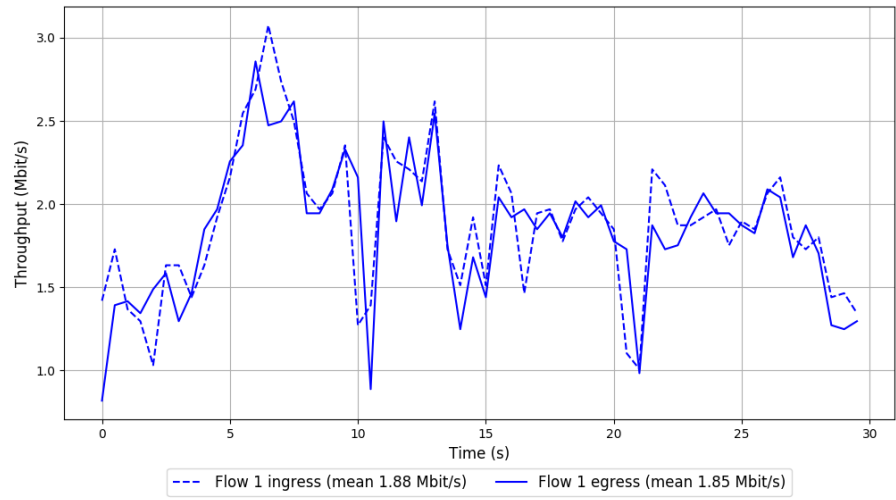test from India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme

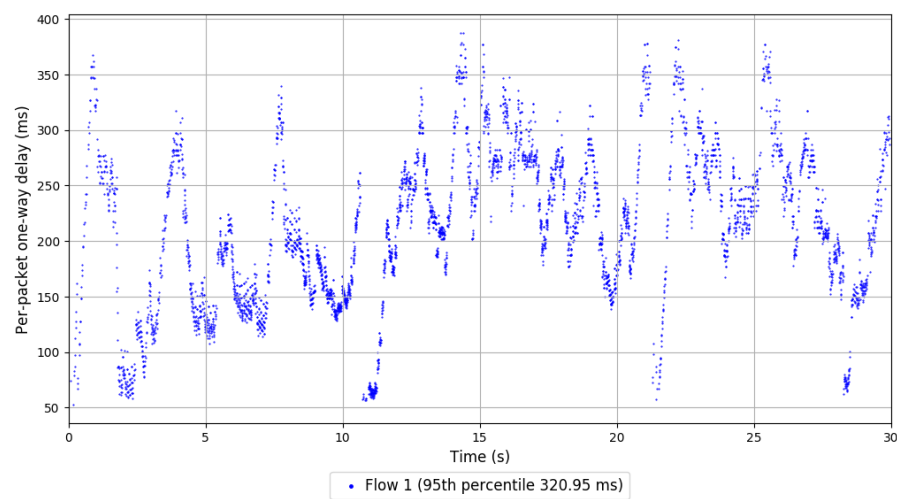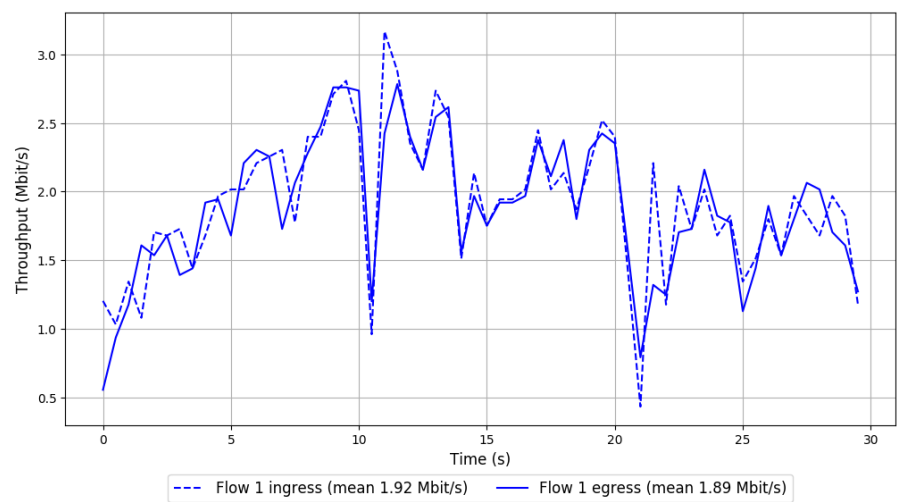| scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	2.04	328.09	1.72
TCP Cubic	3	2.04	339.19	1.65
LEDBAT	3	2.13	222.61	0.77
PCC-Allegro	3	1.95	357.89	21.16
QUIC Cubic	3	2.06	353.02	4.12
SCReAM	3	0.19	89.51	0.21
WebRTC media	3	0.06	252.34	1.42
Sprout	3	0.35	102.45	0.29
TaoVA-100x	3	2.22	224.98	2.53
TCP Vegas	3	2.13	153.24	0.39
Verus	3	2.32	363.64	22.82
Copa	3	1.81	187.58	1.01
FillP	3	1.49	365.00	26.99
Indigo-1-32	3	1.26	114.35	0.74
PCC-Vivace	3	1.54	307.78	2.18
PCC-Expr	0	N/A	N/A	N/A

```
Run 1: Statistics of TCP BBR

Start at: 2018-04-16 20:52:27
End at: 2018-04-16 20:52:57
Local clock offset: 3.903 ms
Remote clock offset: -16.281 ms


# Below is generated by plot.py at 2018-04-16 22:37:58
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 338.347 ms
Loss rate: 2.02%
-- Flow 1:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 338.347 ms
Loss rate: 2.02%
```
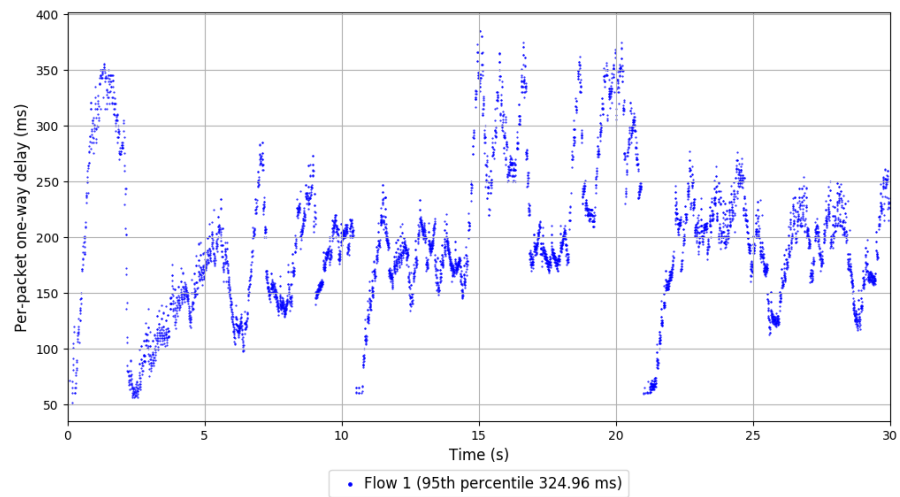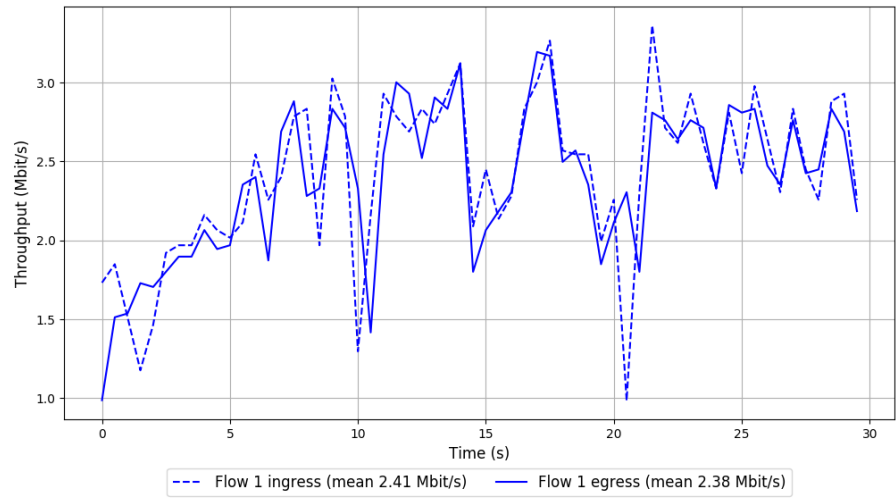
Run 1: Report of TCP BBR — Data Link

Flow 1 ingress (mean 1.88 Mbit/s)   Flow 1 egress (mean 1.85 Mbit/s)

• Flow 1 (95th percentile 338.35 ms)

```
Run 2: Statistics of TCP BBR

Start at: 2018-04-16 21:10:57
End at: 2018-04-16 21:11:27
Local clock offset: -2.458 ms
Remote clock offset: -19.03 ms


# Below is generated by plot.py at 2018-04-16 22:37:58
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 320.950 ms
Loss rate: 1.79%
-- Flow 1:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 320.950 ms
Loss rate: 1.79%
```
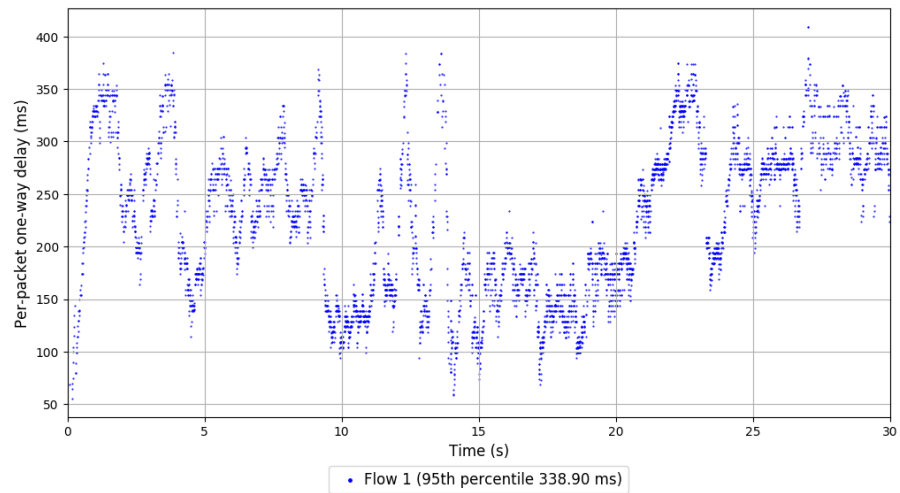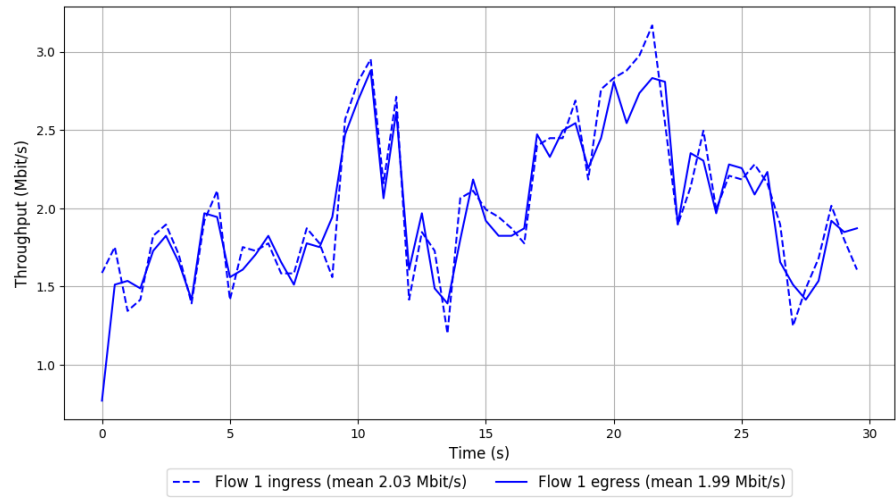
Run 2: Report of TCP BBR — Data Link

Flow 1 ingress (mean 1.92 Mbit/s)   Flow 1 egress (mean 1.89 Mbit/s)

Flow 1 (95th percentile 320.95 ms)

```
Run 3: Statistics of TCP BBR

Start at: 2018-04-16 21:29:26
End at: 2018-04-16 21:29:56
Local clock offset: -0.656 ms
Remote clock offset: -9.948 ms


# Below is generated by plot.py at 2018-04-16 22:37:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 324.959 ms
Loss rate: 1.36%
-- Flow 1:
Average throughput: 2.38 Mbit/s
95th percentile per-packet one-way delay: 324.959 ms
Loss rate: 1.36%
```

Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 2.41 Mbit/s)   Flow 1 egress (mean 2.38 Mbit/s)

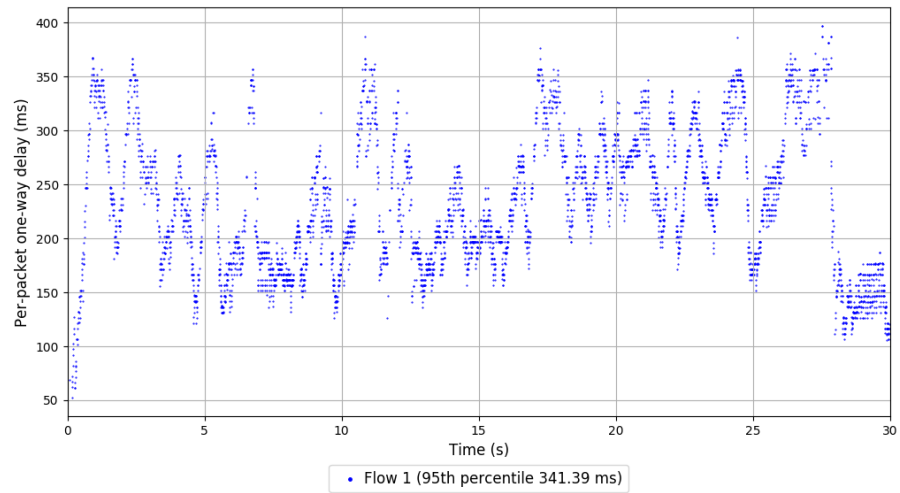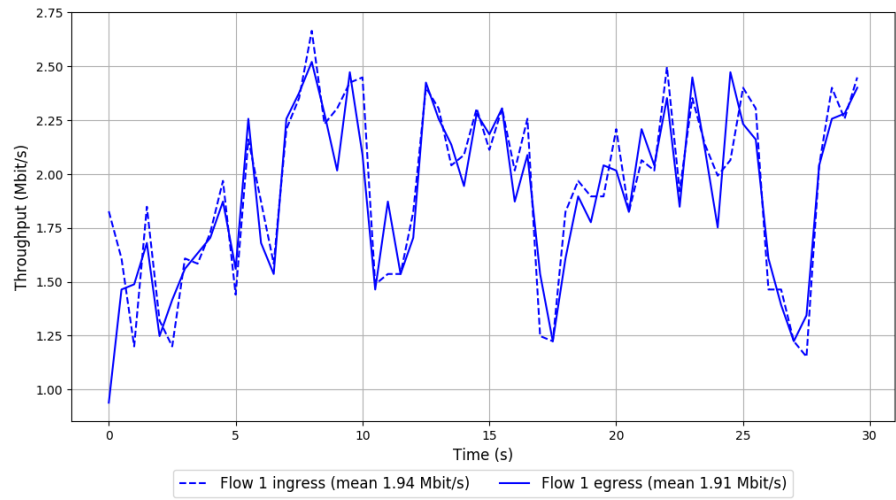Flow 1 (95th percentile 324.96 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2018-04-16 21:02:15
End at: 2018-04-16 21:02:45
Local clock offset: -1.766 ms
Remote clock offset: -17.425 ms


# Below is generated by plot.py at 2018-04-16 22:37:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 338.904 ms
Loss rate: 1.95%
-- Flow 1:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 338.904 ms
Loss rate: 1.95%
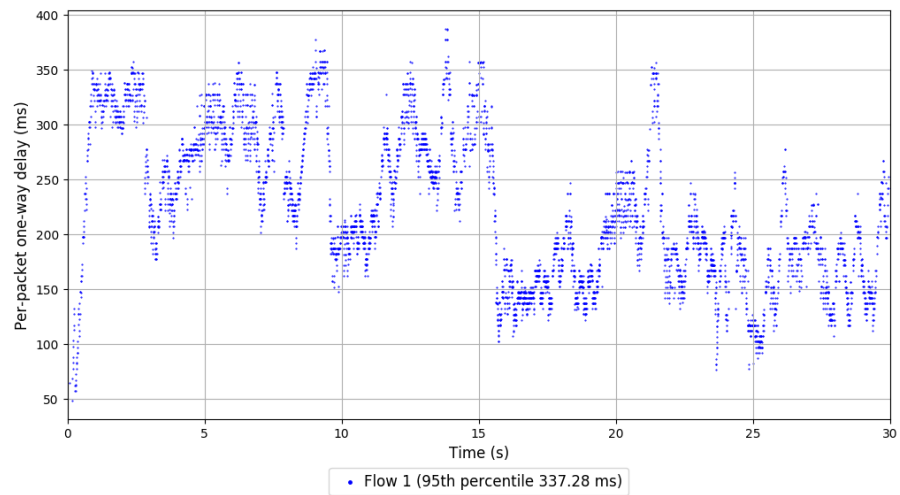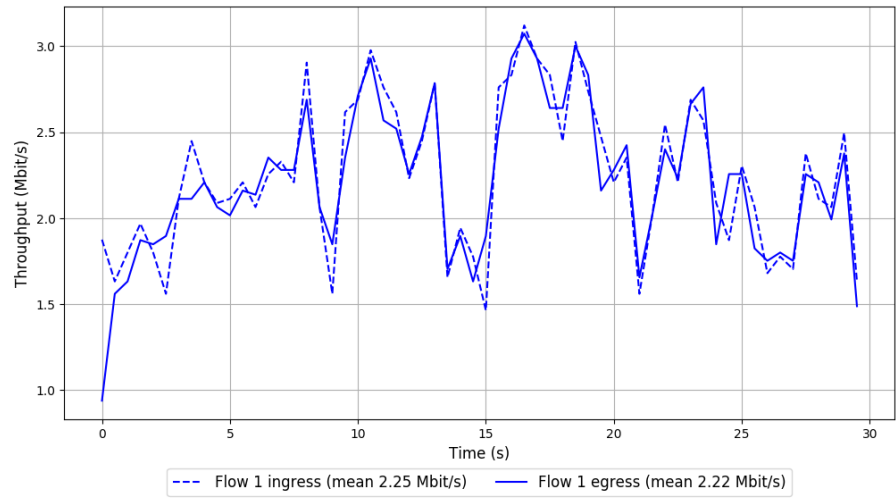```

Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2018-04-16 21:20:45
End at: 2018-04-16 21:21:15
Local clock offset: -4.974 ms
Remote clock offset: -18.326 ms

Below is generated by plot.py at 2018-04-16 22:37:59
Datalink statistics
-- Total of 1 flow:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 341.390 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 341.390 ms
Loss rate: 1.61%
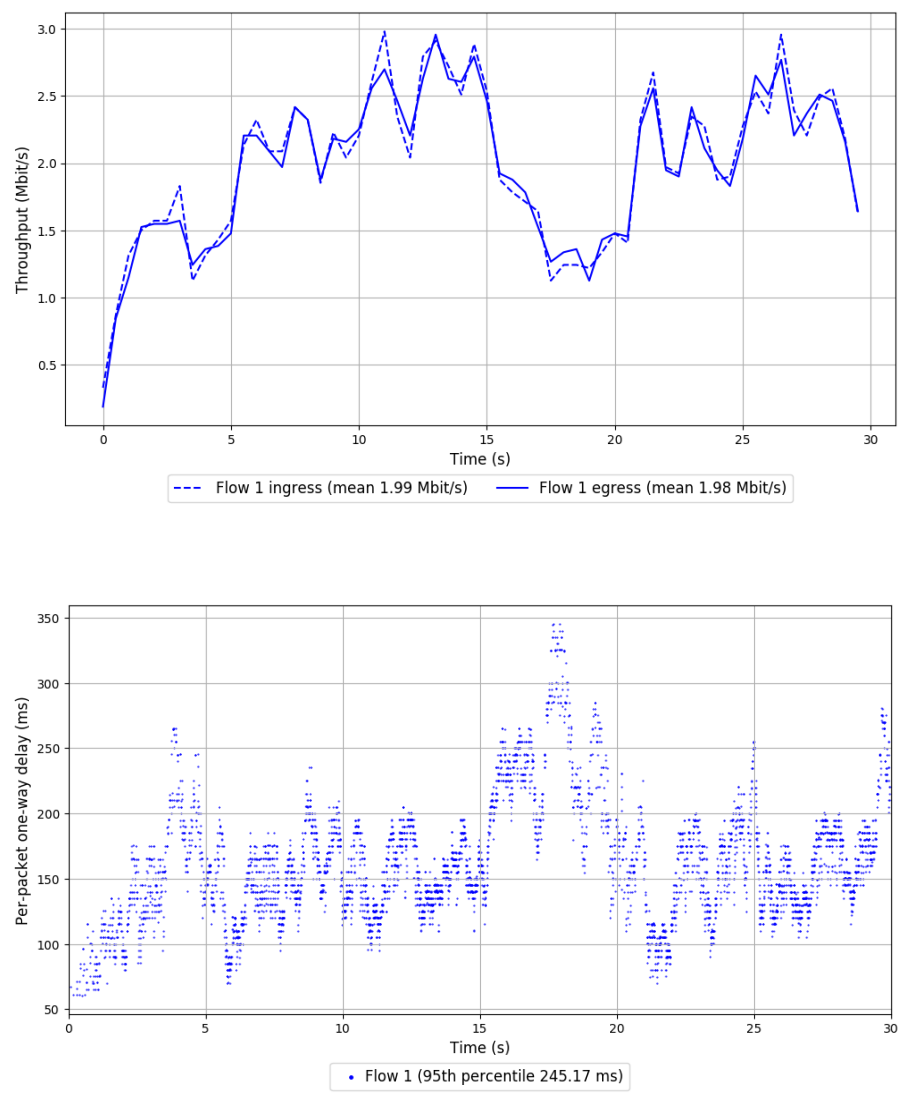```

Run 2: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 1.94 Mbit/s) --- Flow 1 egress (mean 1.91 Mbit/s)
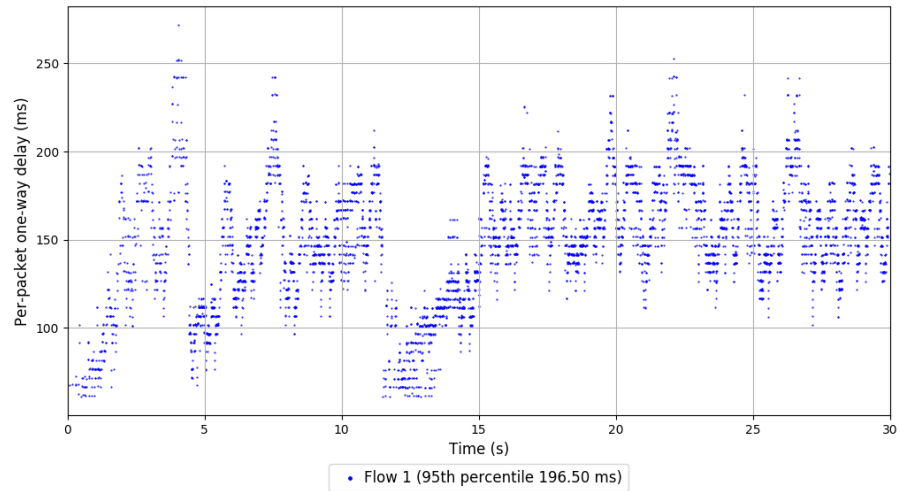

Flow 1 (95th percentile 341.39 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2018-04-16 21:39:13
End at: 2018-04-16 21:39:43
Local clock offset: -0.059 ms
Remote clock offset: -9.781 ms


# Below is generated by plot.py at 2018-04-16 22:37:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 337.284 ms
Loss rate: 1.39%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 337.284 ms
Loss rate: 1.39%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 2.25 Mbit/s)   Flow 1 egress (mean 2.22 Mbit/s)
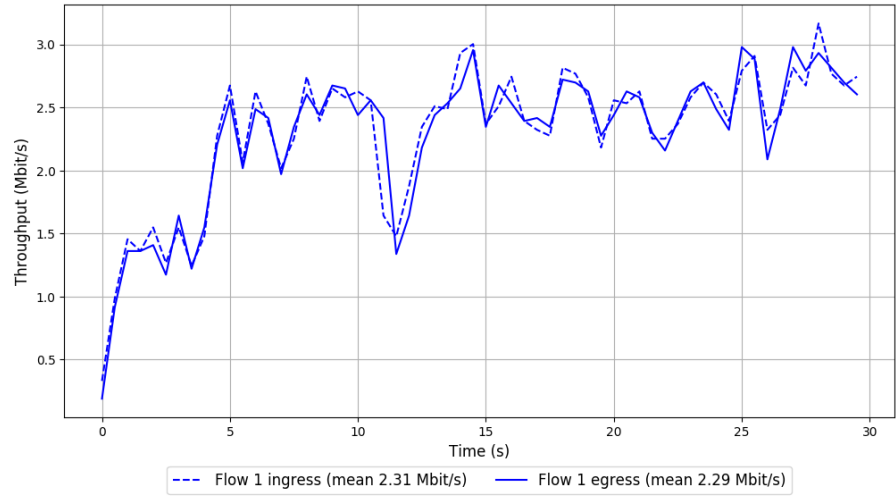

• Flow 1 (95th percentile 337.28 ms)

```
Run 1: Statistics of LEDBAT

Start at: 2018-04-16 20:57:53
End at: 2018-04-16 20:58:23
Local clock offset: -0.522 ms
Remote clock offset: -16.715 ms


# Below is generated by plot.py at 2018-04-16 22:37:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 245.167 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 245.167 ms
Loss rate: 0.73%
```
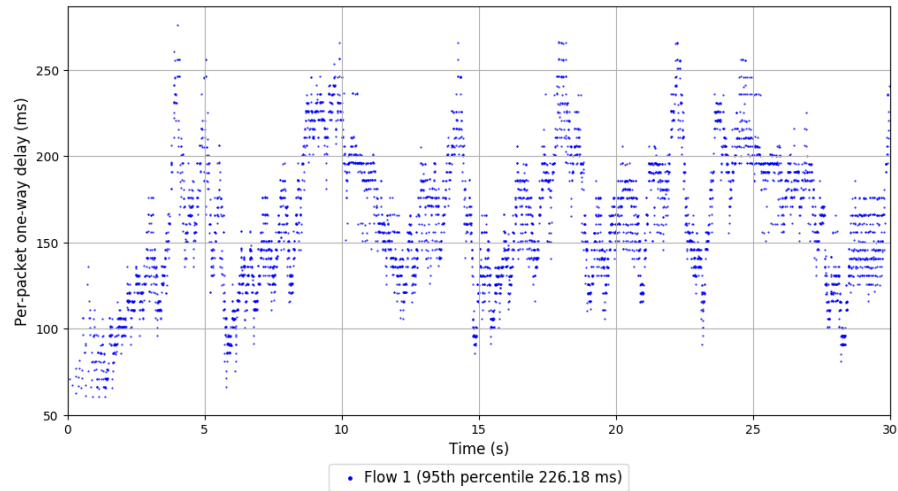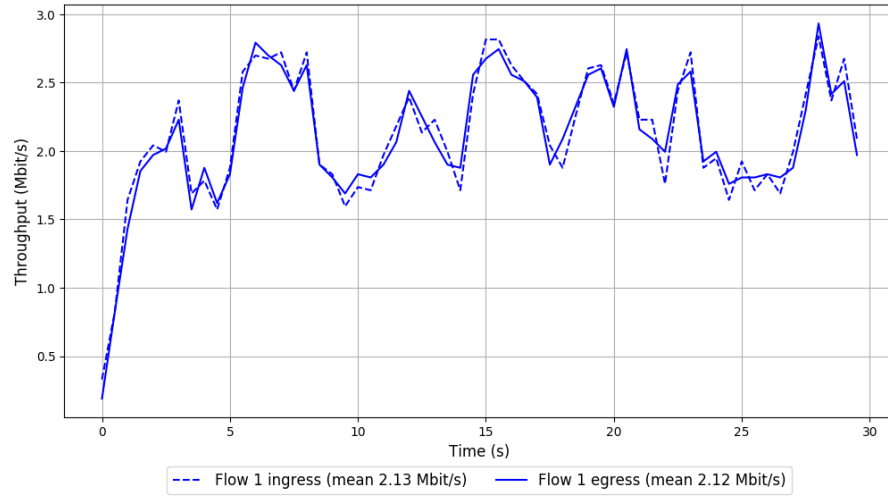
Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2018-04-16 21:16:24
End at: 2018-04-16 21:16:54
Local clock offset: -3.95 ms
Remote clock offset: -13.921 ms


# Below is generated by plot.py at 2018-04-16 22:37:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 196.498 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 2.29 Mbit/s
95th percentile per-packet one-way delay: 196.498 ms
Loss rate: 0.86%
```

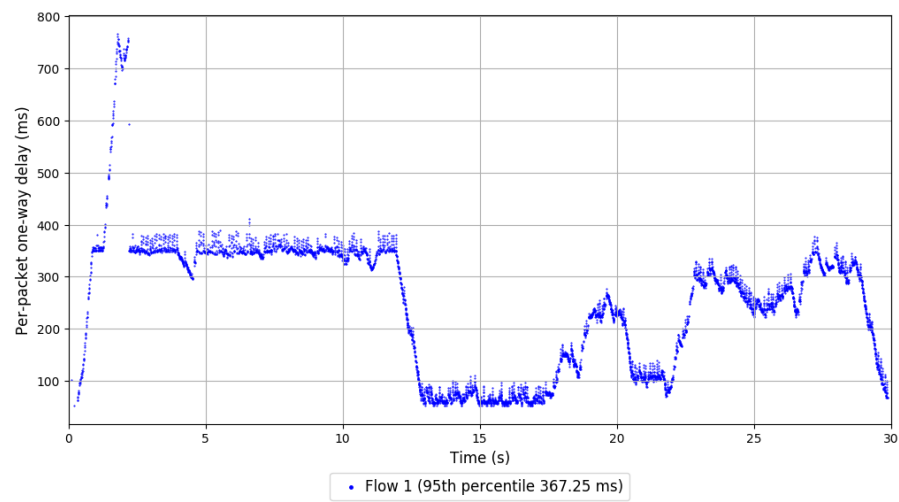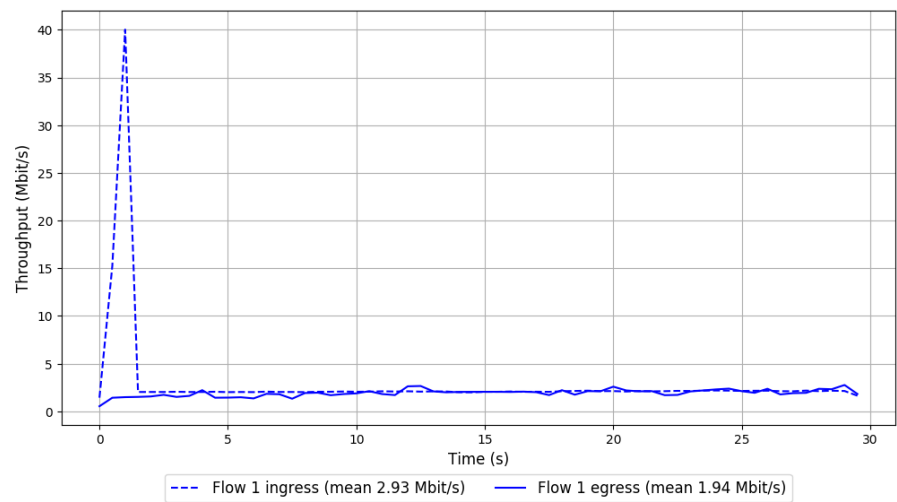# Run 2: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.31 Mbit/s)   Flow 1 egress (mean 2.29 Mbit/s)
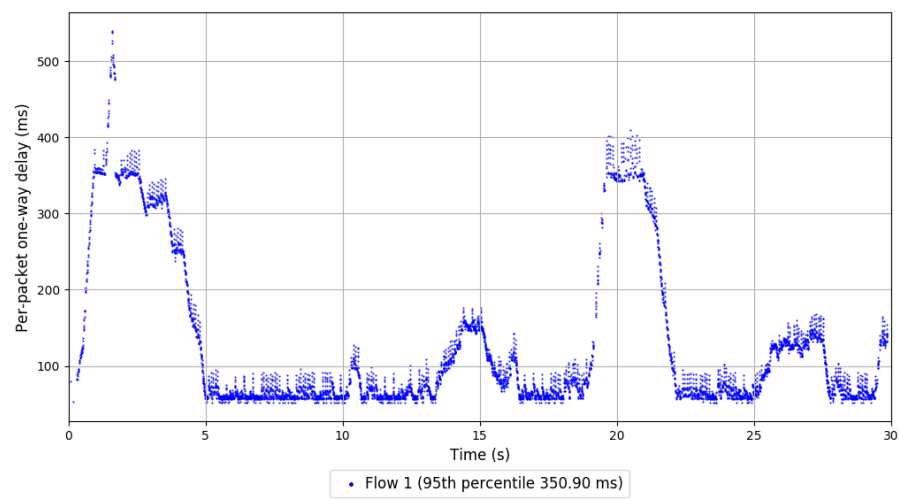

Flow 1 (95th percentile 196.50 ms)

```
Run 3: Statistics of LEDBAT

Start at: 2018-04-16 21:34:52
End at: 2018-04-16 21:35:22
Local clock offset: 1.348 ms
Remote clock offset: -10.516 ms


# Below is generated by plot.py at 2018-04-16 22:38:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 226.177 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 226.177 ms
Loss rate: 0.72%
```

Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 2.13 Mbit/s) Flow 1 egress (mean 2.12 Mbit/s)

Flow 1 (95th percentile 226.18 ms)

```
Run 1: Statistics of PCC-Allegro

Start at: 2018-04-16 20:51:22
End at: 2018-04-16 20:51:52
Local clock offset: 4.767 ms
Remote clock offset: -15.308 ms

# Below is generated by plot.py at 2018-04-16 22:38:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 367.248 ms
Loss rate: 34.11%
-- Flow 1:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 367.248 ms
Loss rate: 34.11%
```
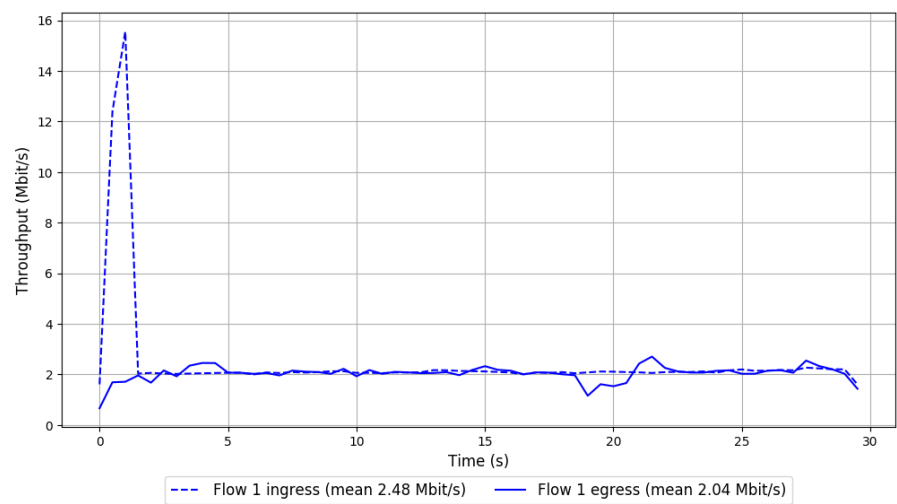
Run 1: Report of PCC-Allegro — Data Link

```
Run 2: Statistics of PCC-Allegro

Start at: 2018-04-16 21:09:52
End at: 2018-04-16 21:10:22
Local clock offset: -2.425 ms
Remote clock offset: -19.109 ms


# Below is generated by plot.py at 2018-04-16 22:38:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 350.899 ms
Loss rate: 17.92%
-- Flow 1:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 350.899 ms
Loss rate: 17.92%
```
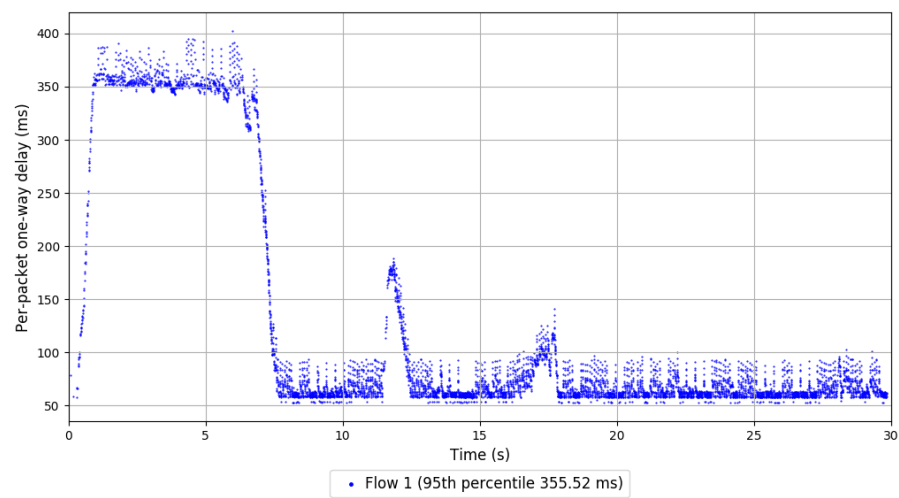
Run 2: Report of PCC-Allegro — Data Link

```
Run 3: Statistics of PCC-Allegro

Start at: 2018-04-16 21:28:21
End at: 2018-04-16 21:28:51
Local clock offset: 0.718 ms
Remote clock offset: -10.868 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 355.524 ms
Loss rate: 11.44%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 355.524 ms
Loss rate: 11.44%
```
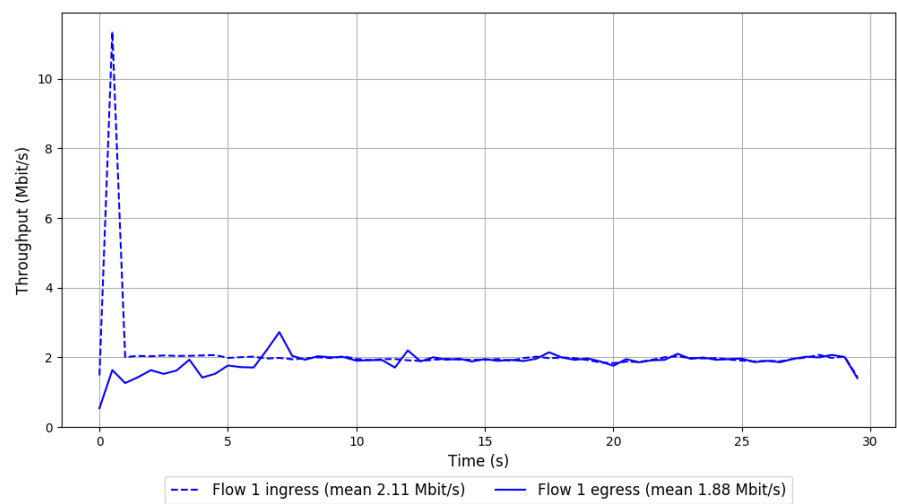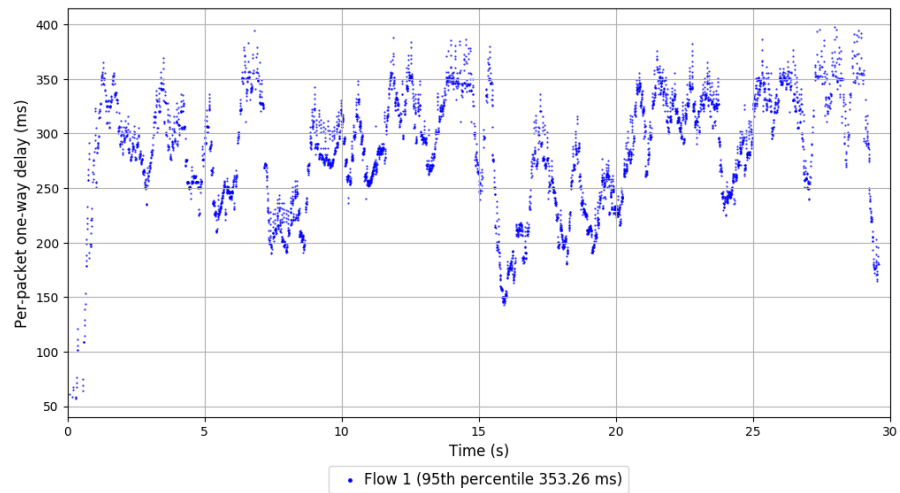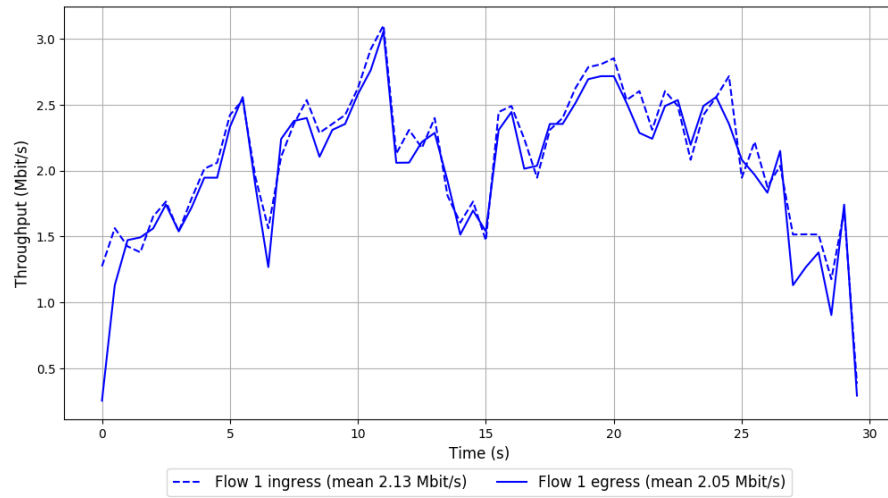
Run 3: Report of PCC-Allegro — Data Link

Flow 1 ingress (mean 2.11 Mbit/s)   Flow 1 egress (mean 1.88 Mbit/s)
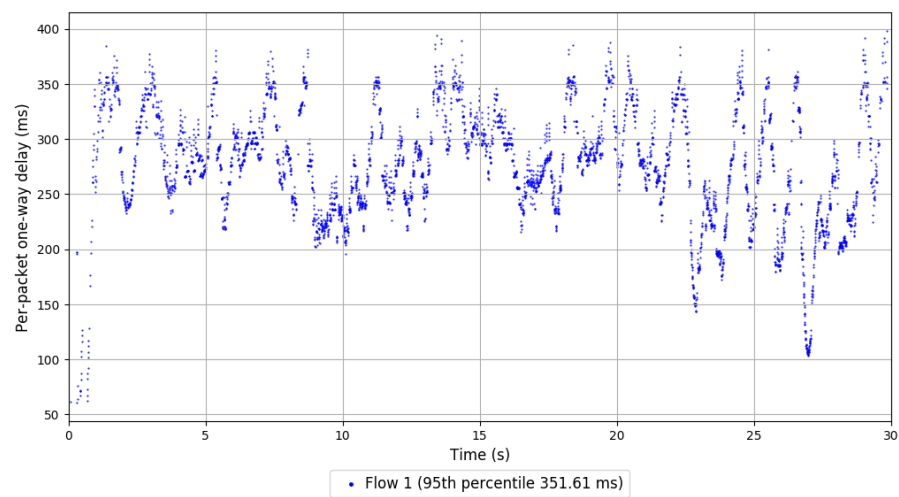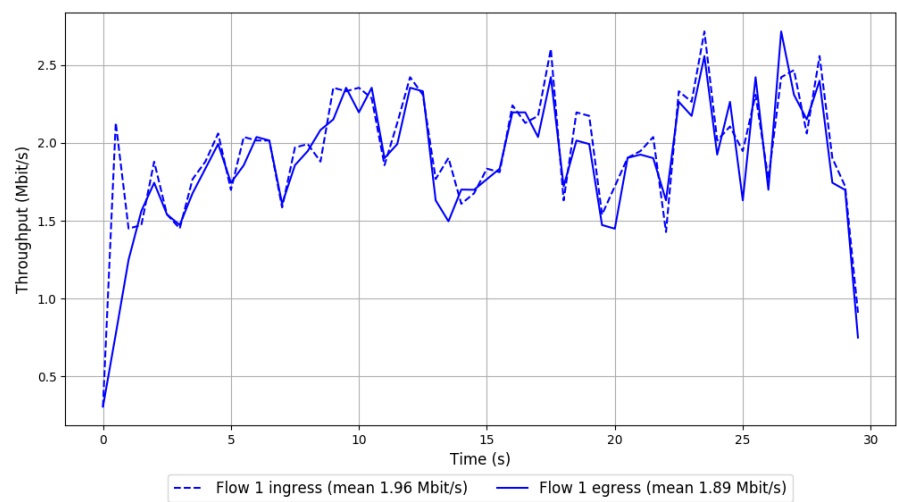

Flow 1 (95th percentile 355.52 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2018-04-16 20:55:43
End at: 2018-04-16 20:56:13
Local clock offset: 0.462 ms
Remote clock offset: -16.761 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 353.257 ms
Loss rate: 4.35%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 353.257 ms
Loss rate: 4.35%
```
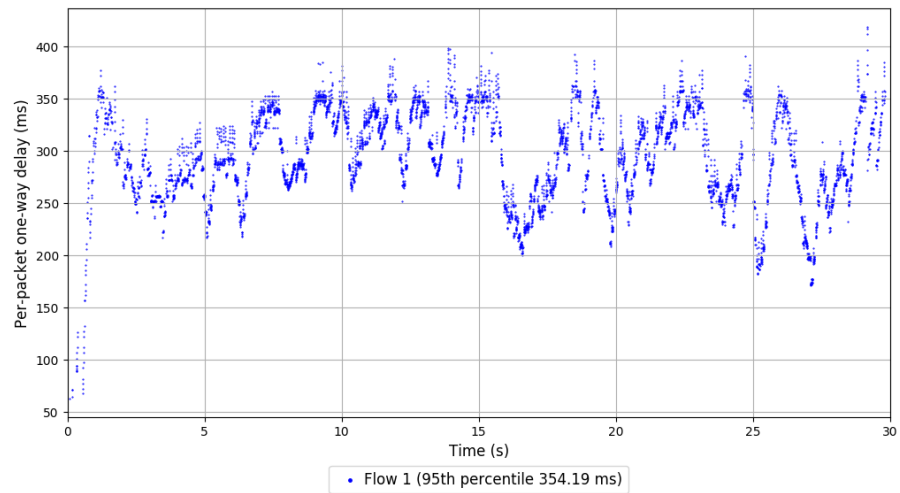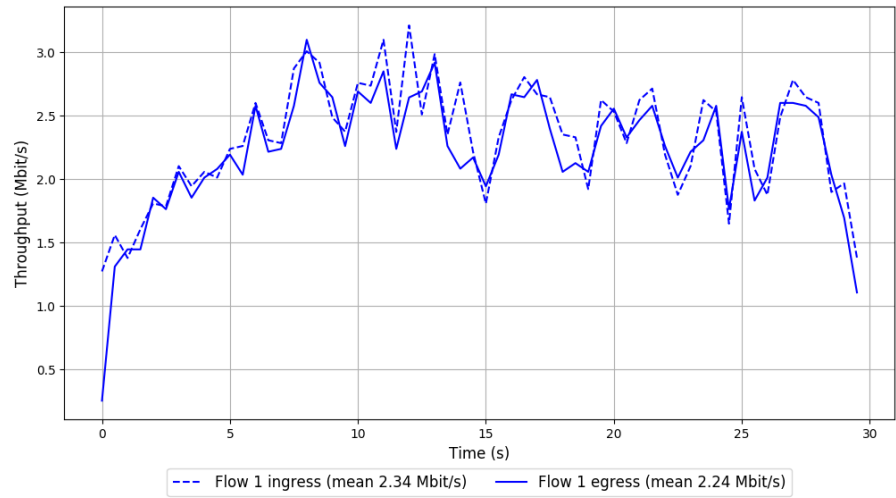
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2018-04-16 21:14:13
End at: 2018-04-16 21:14:43
Local clock offset: -1.906 ms
Remote clock offset: -16.227 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 351.609 ms
Loss rate: 3.74%
-- Flow 1:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 351.609 ms
Loss rate: 3.74%
```
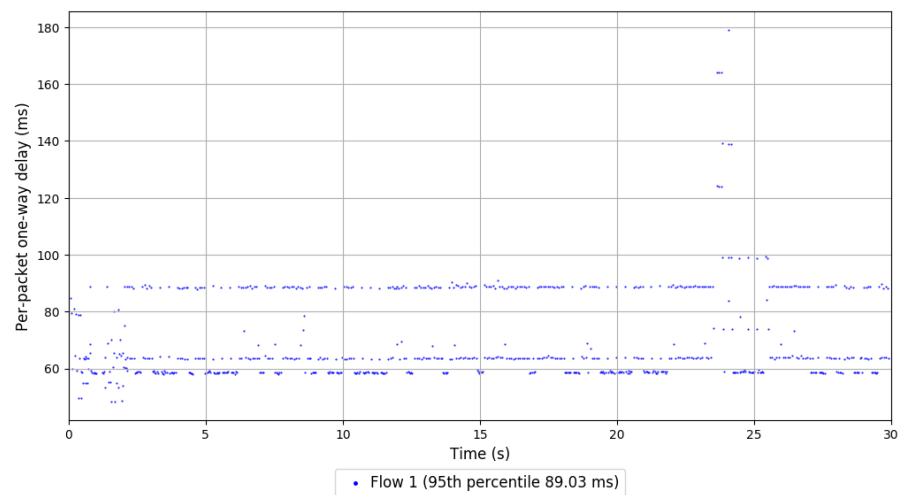
Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2018-04-16 21:32:42
End at: 2018-04-16 21:33:12
Local clock offset: 1.36 ms
Remote clock offset: -10.782 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 354.187 ms
Loss rate: 4.28%
-- Flow 1:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 354.187 ms
Loss rate: 4.28%
```

Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 2.34 Mbit/s) --- Flow 1 egress (mean 2.24 Mbit/s)
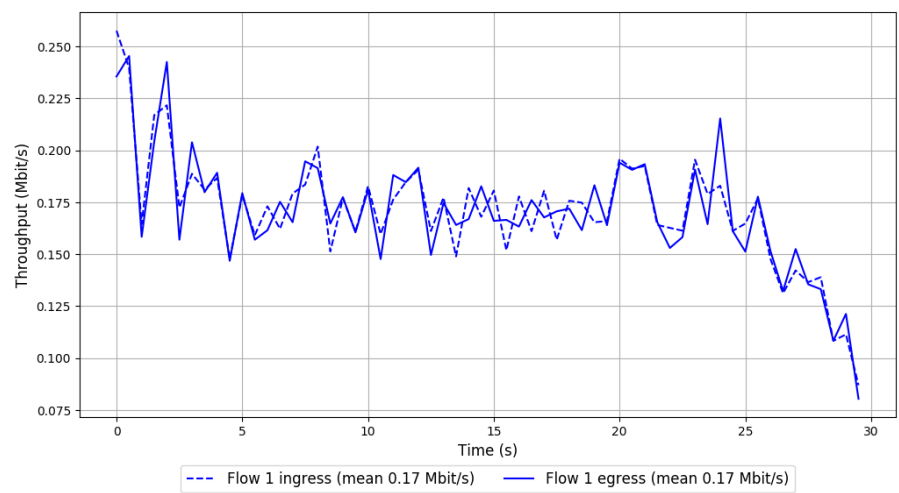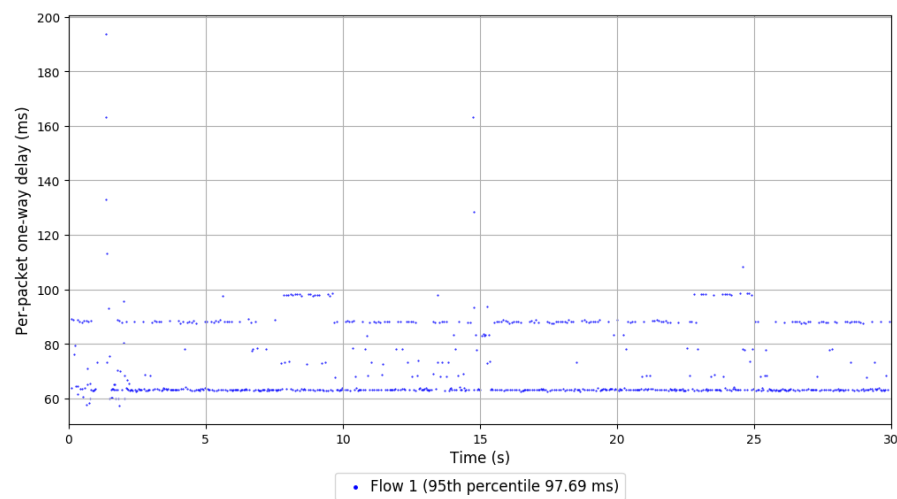

Flow 1 (95th percentile 354.19 ms)

```
Run 1: Statistics of SCReAM

Start at: 2018-04-16 20:56:48
End at: 2018-04-16 20:57:18
Local clock offset: -0.032 ms
Remote clock offset: -16.193 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 89.035 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 89.035 ms
Loss rate: 0.14%
```

Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.17 Mbit/s) --- Flow 1 egress (mean 0.17 Mbit/s)
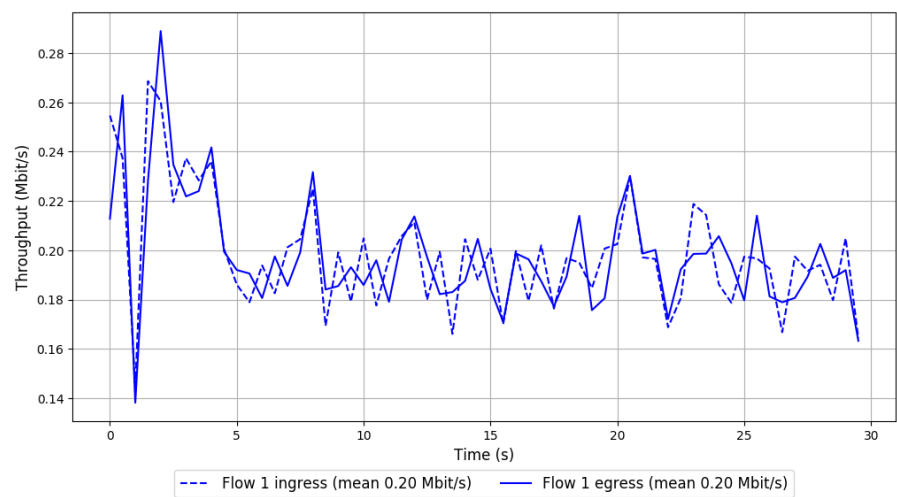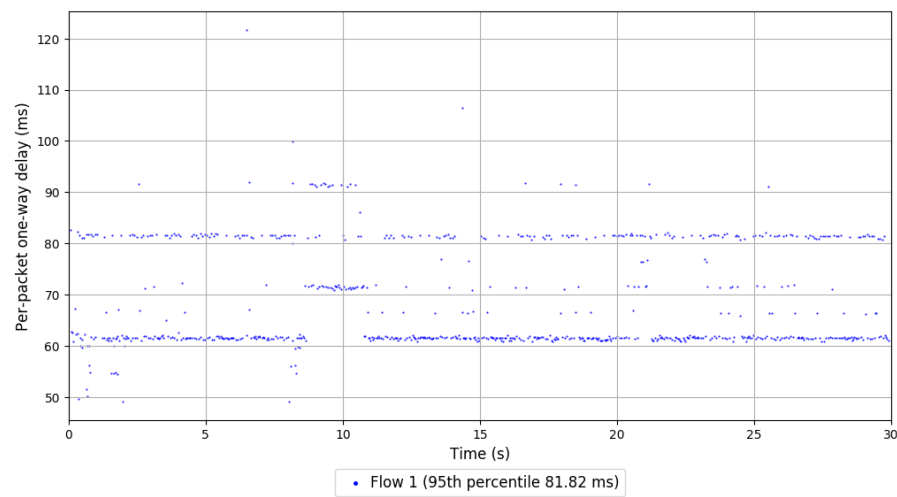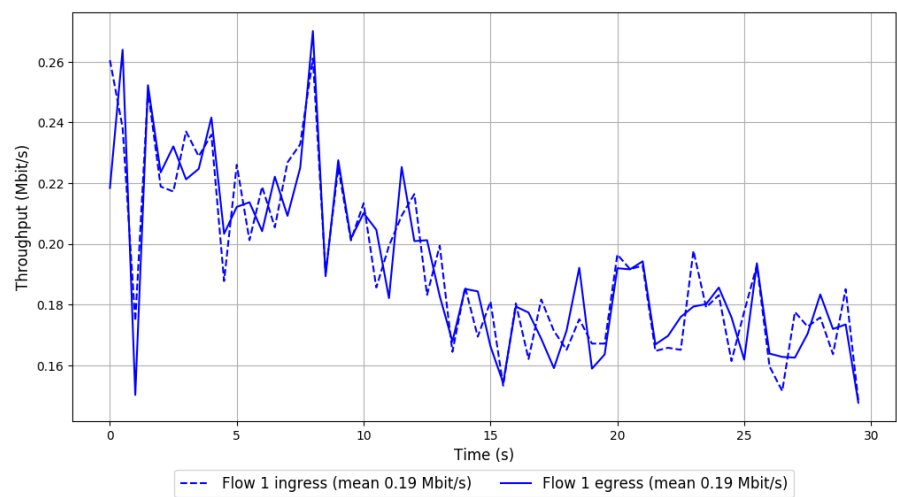

Flow 1 (95th percentile 89.03 ms)

```
Run 2: Statistics of SCReAM

Start at: 2018-04-16 21:15:18
End at: 2018-04-16 21:15:48
Local clock offset: -0.915 ms
Remote clock offset: -14.701 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 97.685 ms
Loss rate: 0.25%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 97.685 ms
Loss rate: 0.25%
```

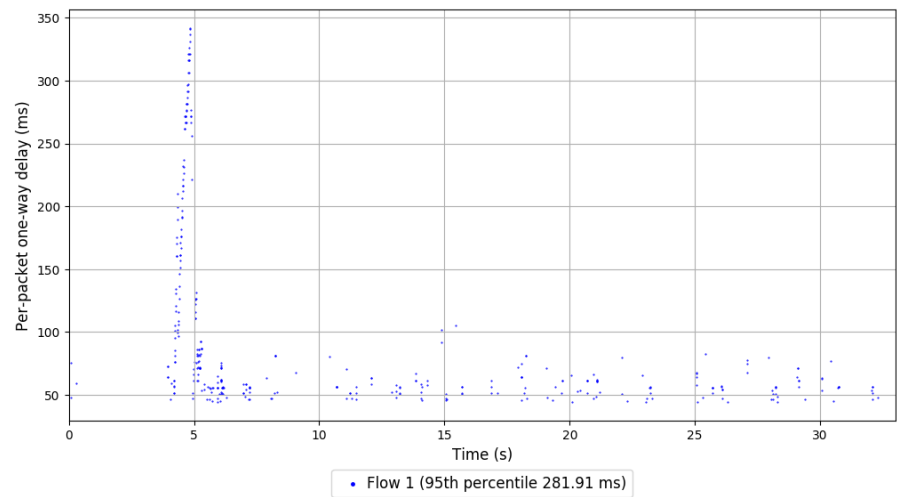Run 2: Report of SCReAM — Data Link

```
Run 3: Statistics of SCReAM

Start at: 2018-04-16 21:33:47
End at: 2018-04-16 21:34:17
Local clock offset: 0.098 ms
Remote clock offset: -10.22 ms


# Below is generated by plot.py at 2018-04-16 22:38:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 81.821 ms
Loss rate: 0.23%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 81.821 ms
Loss rate: 0.23%
```

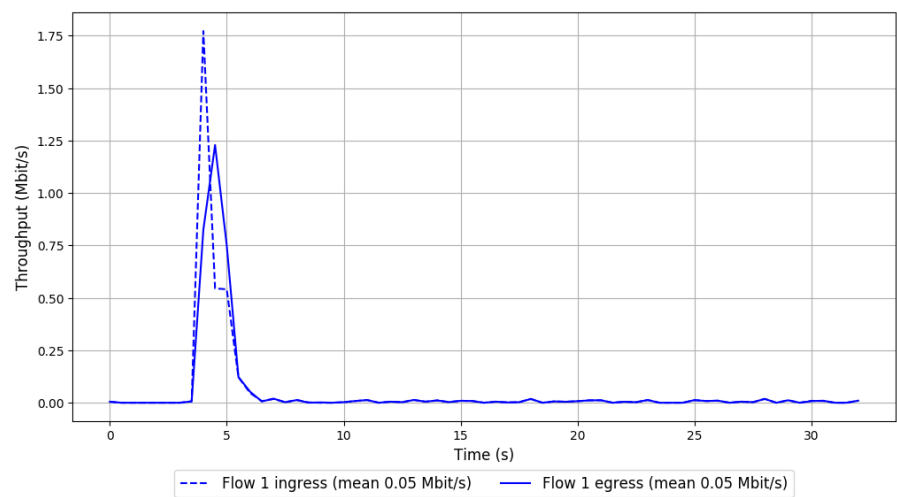Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2018-04-16 21:04:25
End at: 2018-04-16 21:04:55
Local clock offset: -3.362 ms
Remote clock offset: -17.127 ms


# Below is generated by plot.py at 2018-04-16 22:38:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 281.910 ms
Loss rate: 1.43%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 281.910 ms
Loss rate: 1.43%
```
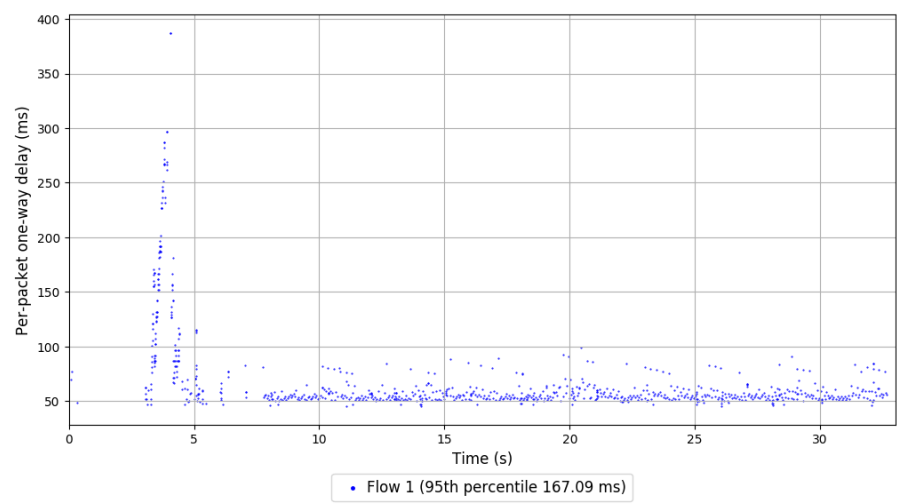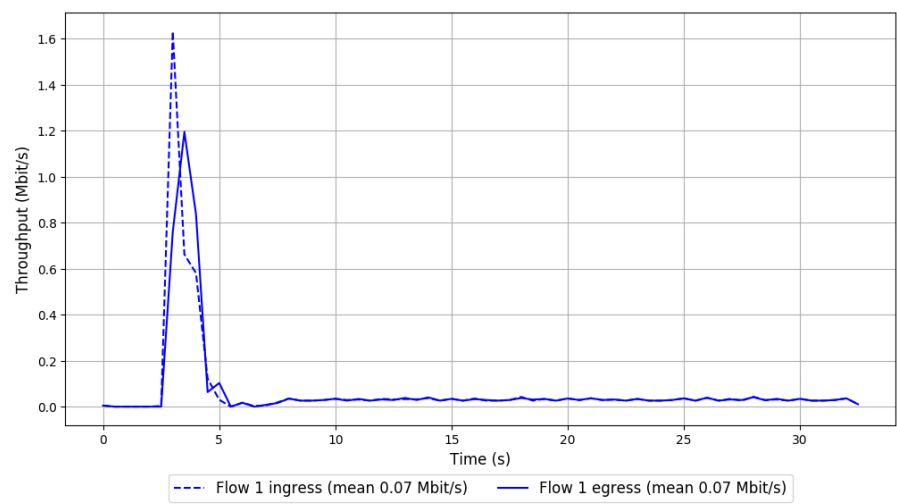
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2018-04-16 21:22:55
End at: 2018-04-16 21:23:25
Local clock offset: -2.103 ms
Remote clock offset: -11.847 ms


# Below is generated by plot.py at 2018-04-16 22:38:10
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 167.092 ms
Loss rate: 1.62%
-- Flow 1:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 167.092 ms
Loss rate: 1.62%
```
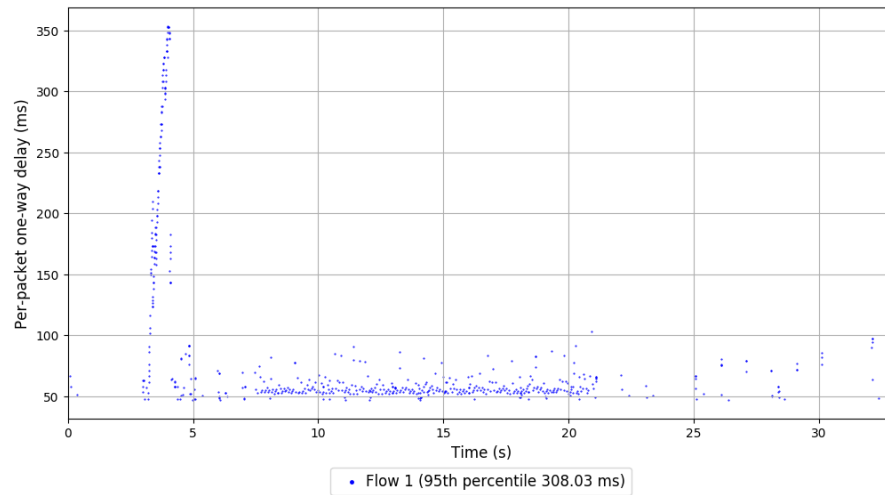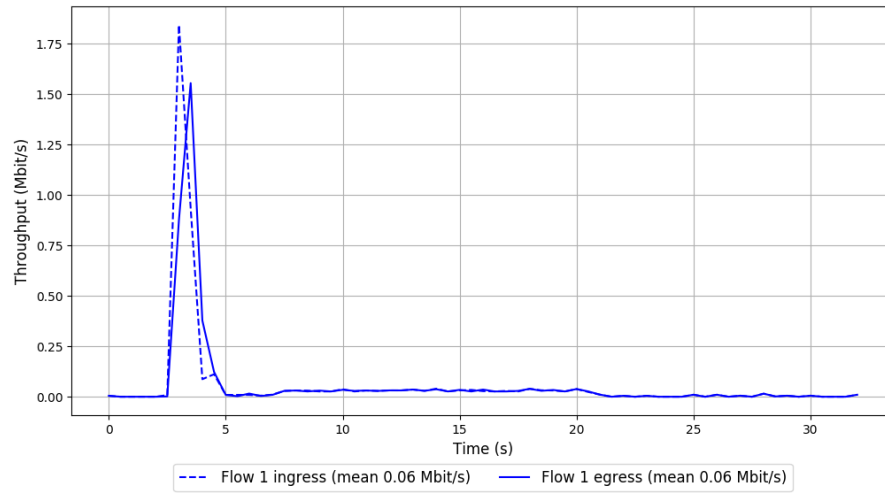
Run 2: Report of WebRTC media — Data Link

```
Run 3: Statistics of WebRTC media

Start at: 2018-04-16 21:41:23
End at: 2018-04-16 21:41:53
Local clock offset: 0.776 ms
Remote clock offset: -10.018 ms


# Below is generated by plot.py at 2018-04-16 22:38:10
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 308.029 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 308.029 ms
Loss rate: 1.22%
```
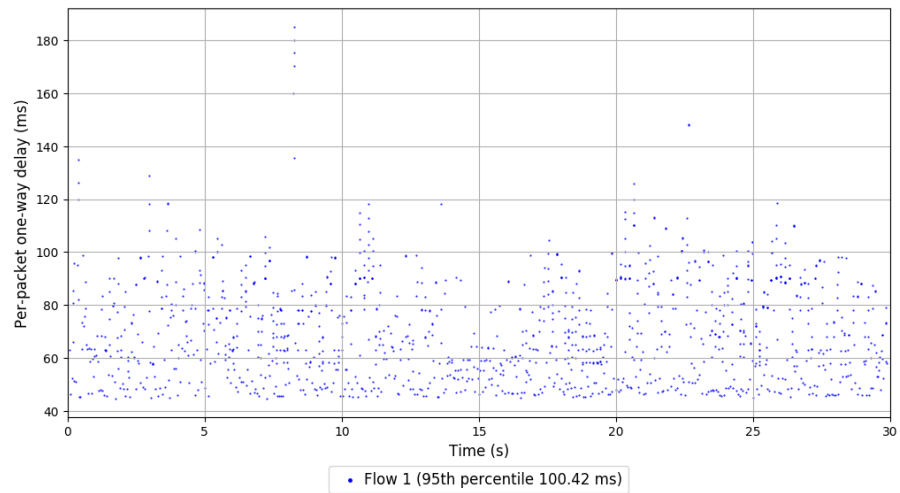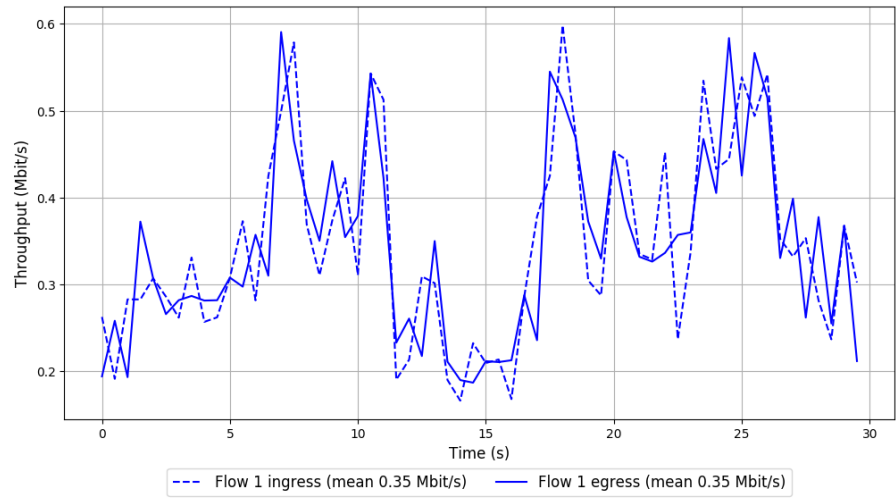
Run 3: Report of WebRTC media — Data Link

```
Run 1: Statistics of Sprout

Start at: 2018-04-16 20:54:38
End at: 2018-04-16 20:55:08
Local clock offset: 1.179 ms
Remote clock offset: -15.365 ms

# Below is generated by plot.py at 2018-04-16 22:38:10
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 100.419 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 100.419 ms
Loss rate: 0.44%
```
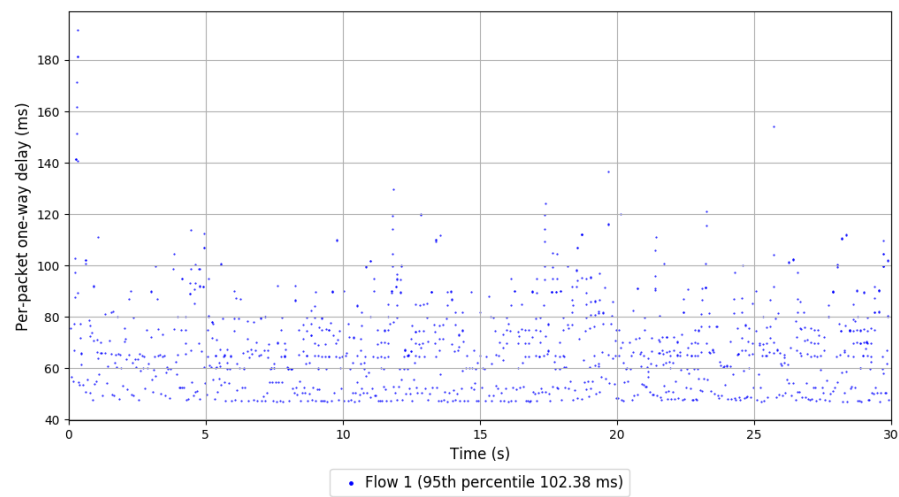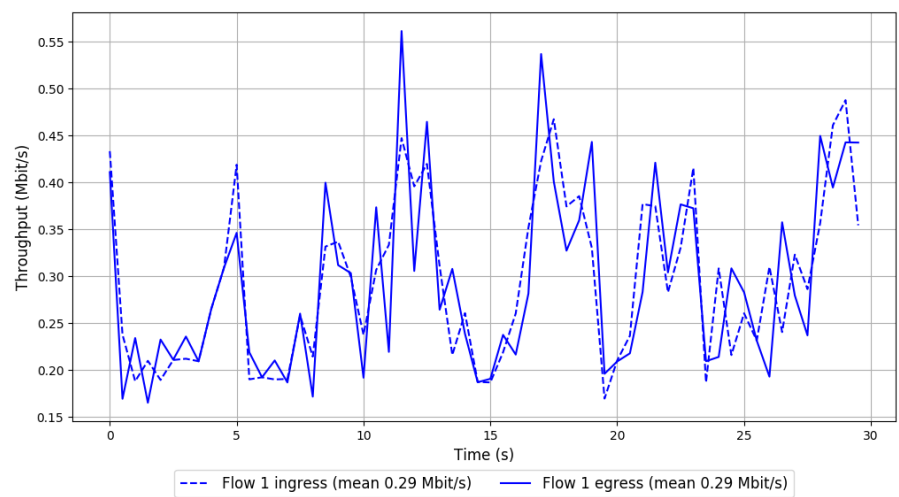
Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2018-04-16 21:13:07
End at: 2018-04-16 21:13:37
Local clock offset: -1.981 ms
Remote clock offset: -17.172 ms


# Below is generated by plot.py at 2018-04-16 22:38:11
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 102.379 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 102.379 ms
Loss rate: 0.26%
```
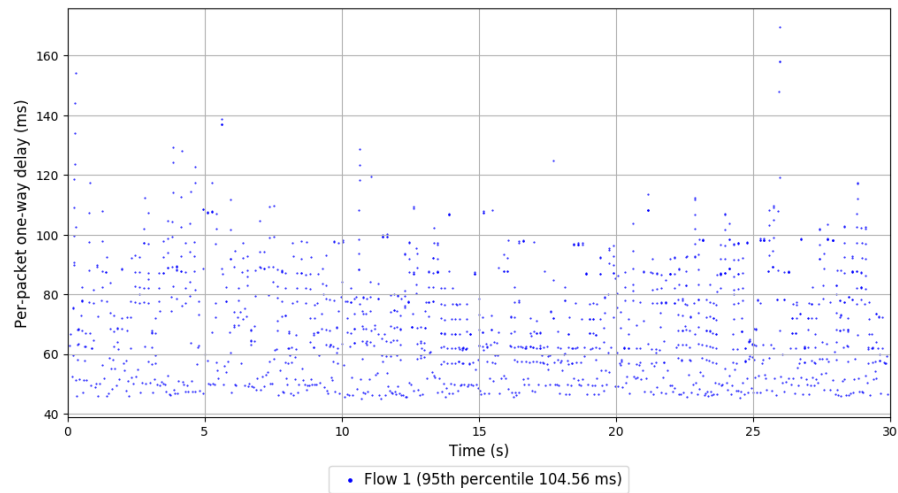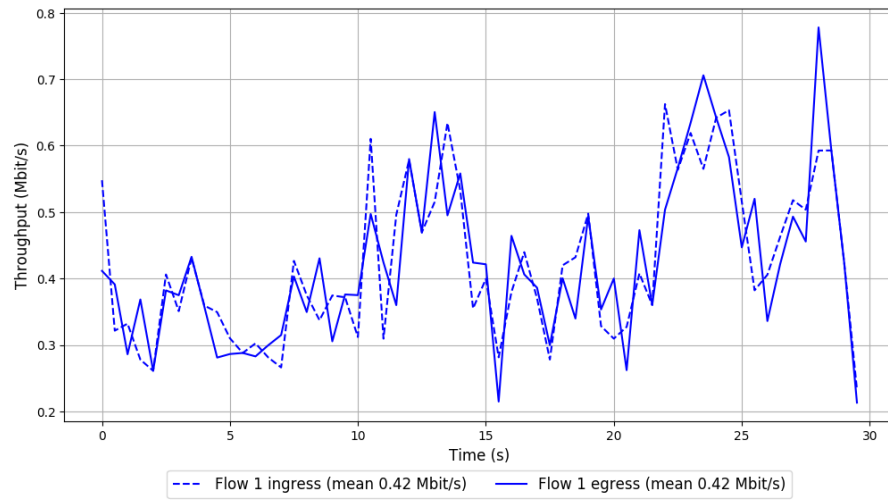
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2018-04-16 21:31:37
End at: 2018-04-16 21:32:07
Local clock offset: -1.204 ms
Remote clock offset: -10.209 ms


# Below is generated by plot.py at 2018-04-16 22:38:11
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 104.562 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 104.562 ms
Loss rate: 0.17%
```

Run 3: Report of Sprout — Data Link

Flow 1 ingress (mean 0.42 Mbit/s)   Flow 1 egress (mean 0.42 Mbit/s)

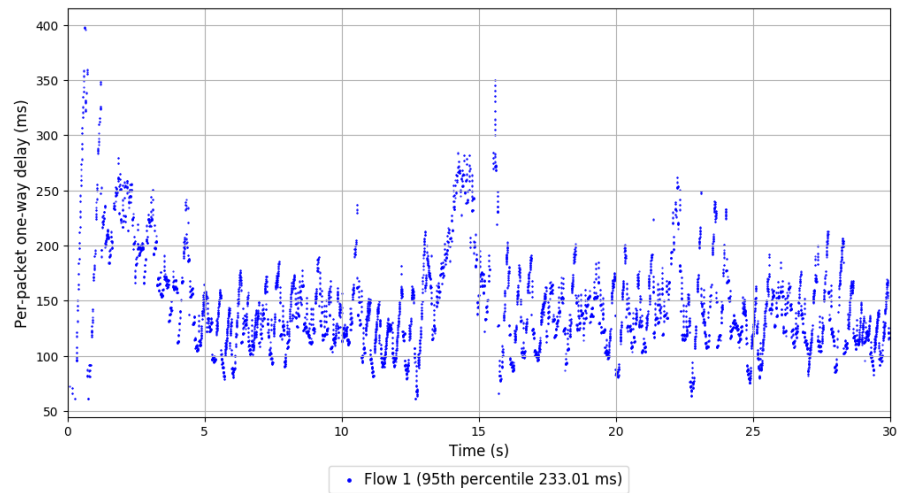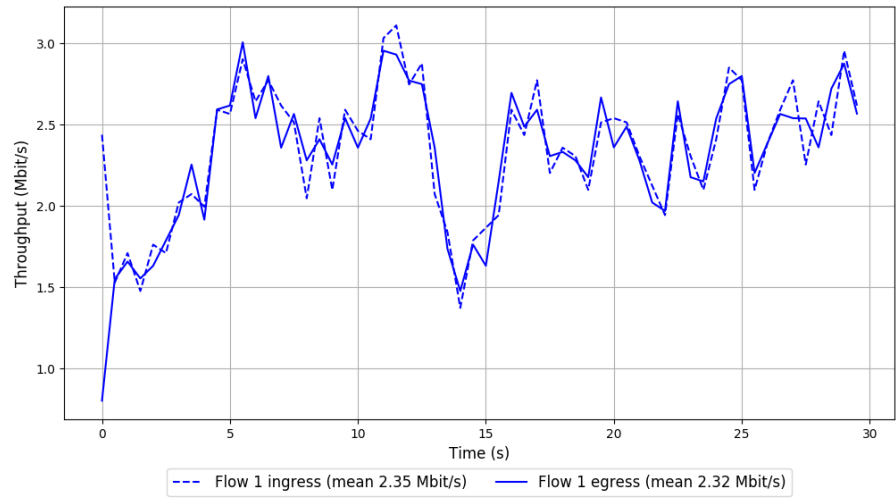Flow 1 (95th percentile 104.56 ms)

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

Start at: 2018-04-16 20:58:58
End at: 2018-04-16 20:59:28
Local clock offset: -0.884 ms
Remote clock offset: -17.188 ms


# Below is generated by plot.py at 2018-04-16 22:38:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 233.010 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 233.010 ms
Loss rate: 1.17%
```

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

Flow 1 ingress (mean 2.35 Mbit/s) ---- Flow 1 egress (mean 2.32 Mbit/s)
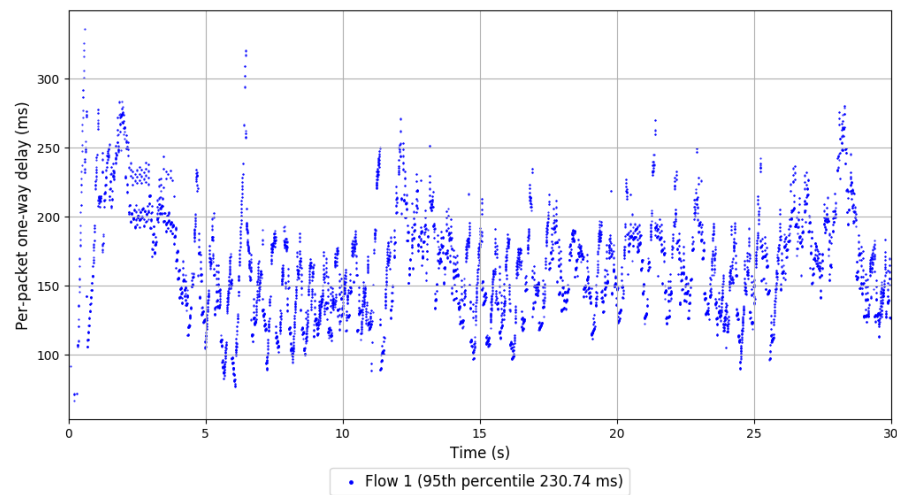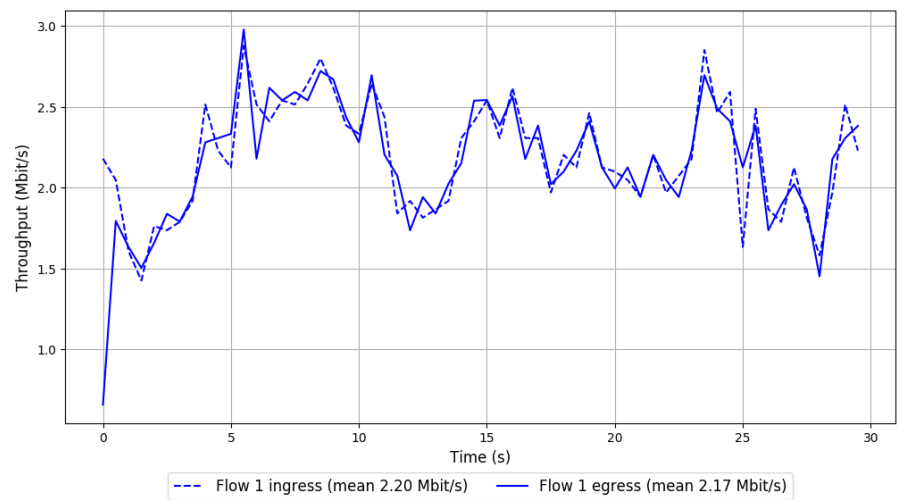

Flow 1 (95th percentile 233.01 ms)

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

Start at: 2018-04-16 21:17:29
End at: 2018-04-16 21:17:59
Local clock offset: -0.401 ms
Remote clock offset: -14.096 ms


# Below is generated by plot.py at 2018-04-16 22:38:17
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 230.736 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 230.736 ms
Loss rate: 1.25%
```

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

Flow 1 ingress (mean 2.20 Mbit/s)   ——— Flow 1 egress (mean 2.17 Mbit/s)
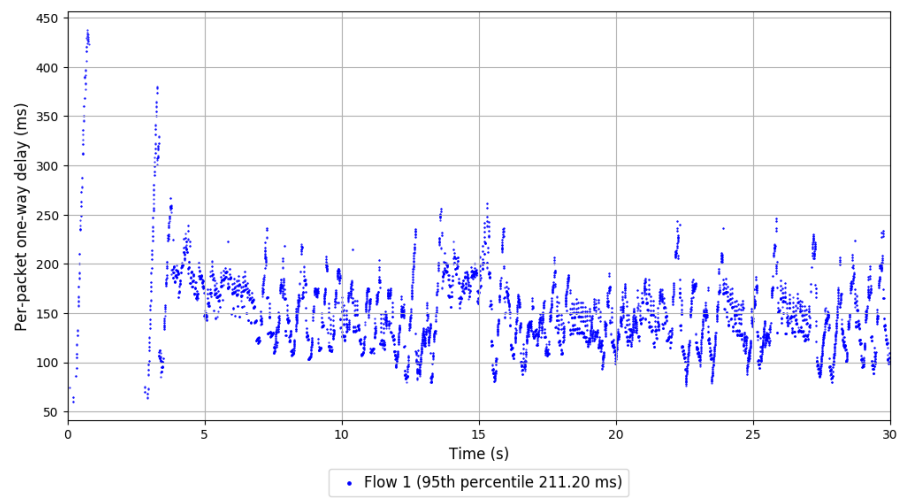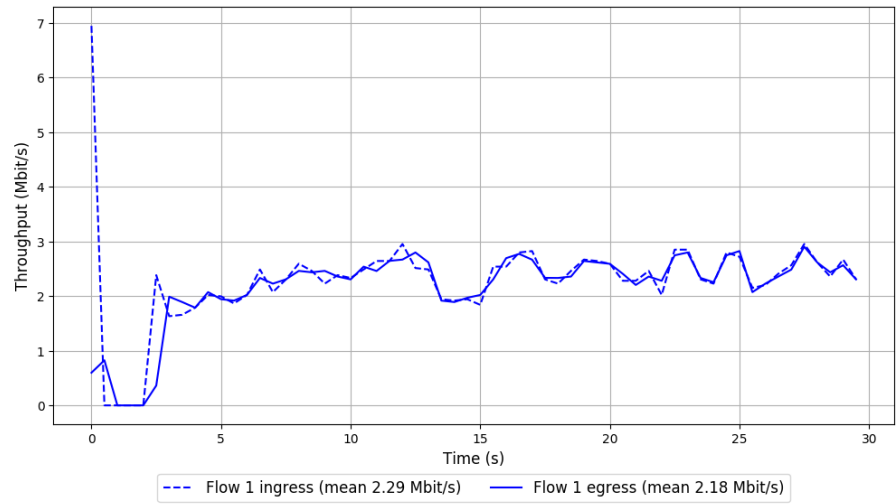

• Flow 1 (95th percentile 230.74 ms)

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

Start at: 2018-04-16 21:35:57
End at: 2018-04-16 21:36:27
Local clock offset: -0.63 ms
Remote clock offset: -10.712 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 211.203 ms
Loss rate: 5.18%
-- Flow 1:
Average throughput: 2.18 Mbit/s
95th percentile per-packet one-way delay: 211.203 ms
Loss rate: 5.18%
```

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

Flow 1 ingress (mean 2.29 Mbit/s) — Flow 1 egress (mean 2.18 Mbit/s)

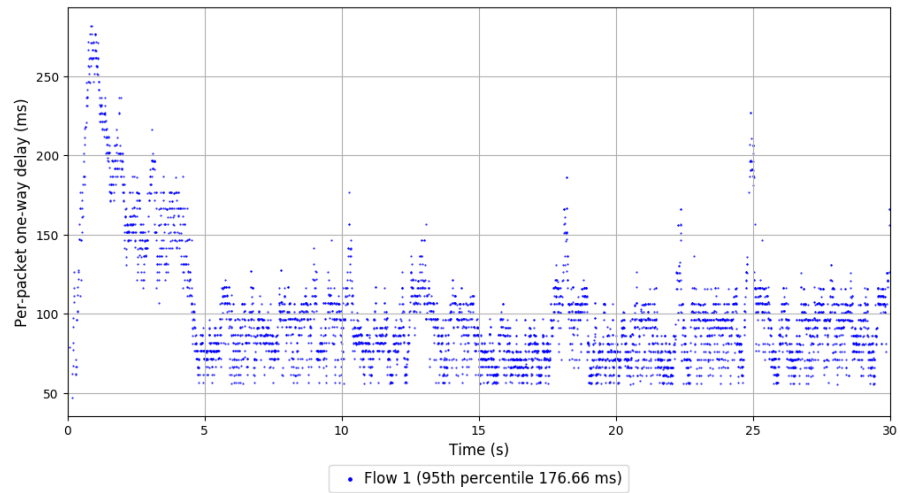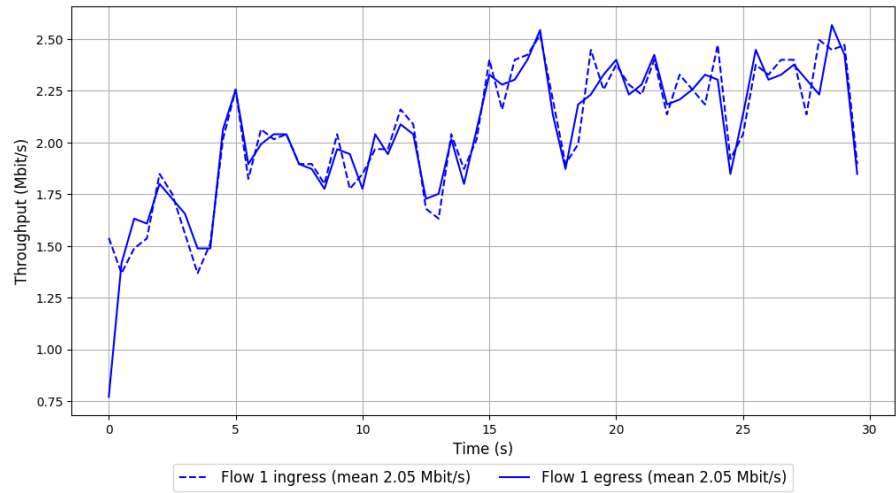Flow 1 (95th percentile 211.20 ms)

```
Run 1: Statistics of TCP Vegas

Start at: 2018-04-16 20:49:11
End at: 2018-04-16 20:49:41
Local clock offset: 3.126 ms
Remote clock offset: -14.743 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 176.657 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 176.657 ms
Loss rate: 0.43%
```
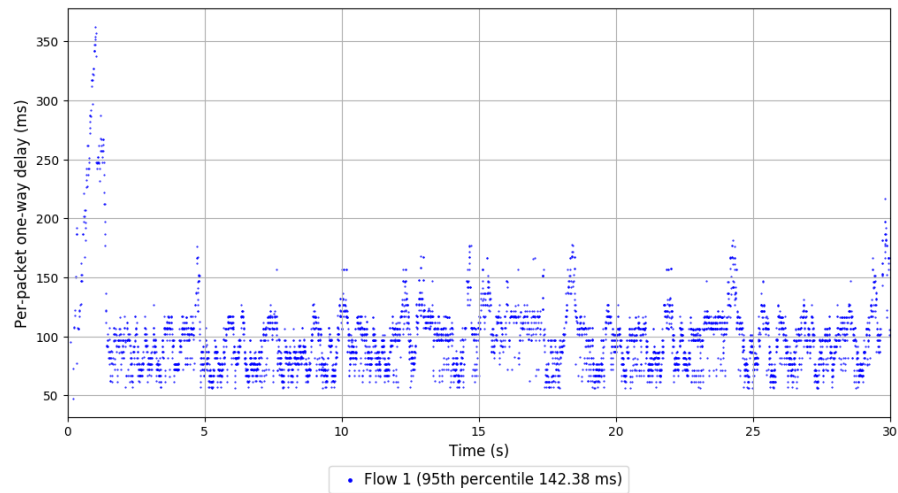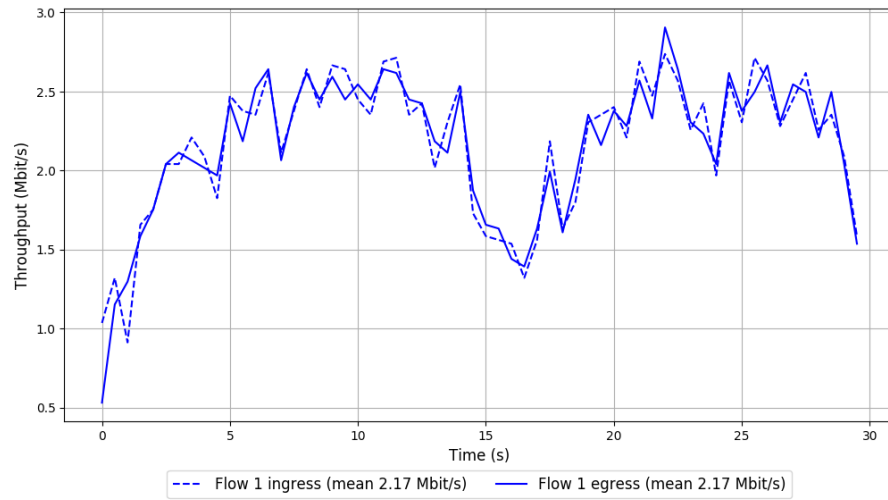
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2018-04-16 21:07:41
End at: 2018-04-16 21:08:11
Local clock offset: -2.053 ms
Remote clock offset: -17.743 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 142.384 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 142.384 ms
Loss rate: 0.40%
```

Run 2: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 2.17 Mbit/s) --- Flow 1 egress (mean 2.17 Mbit/s)

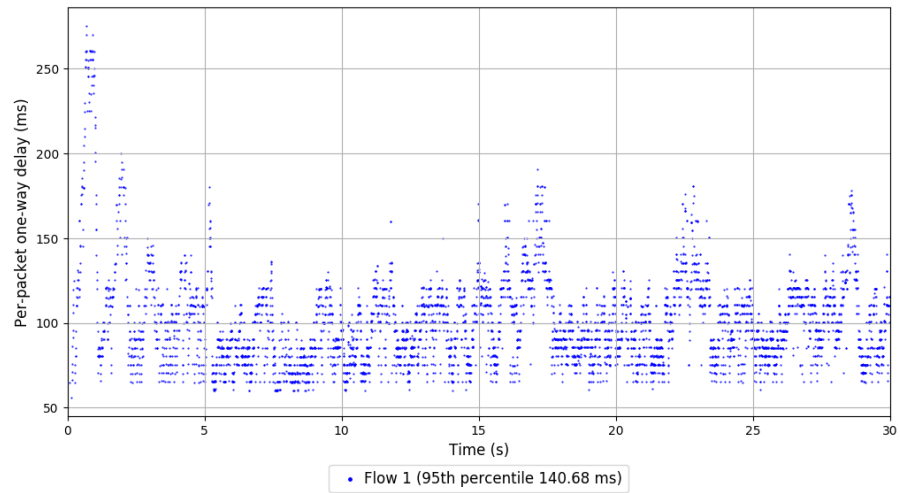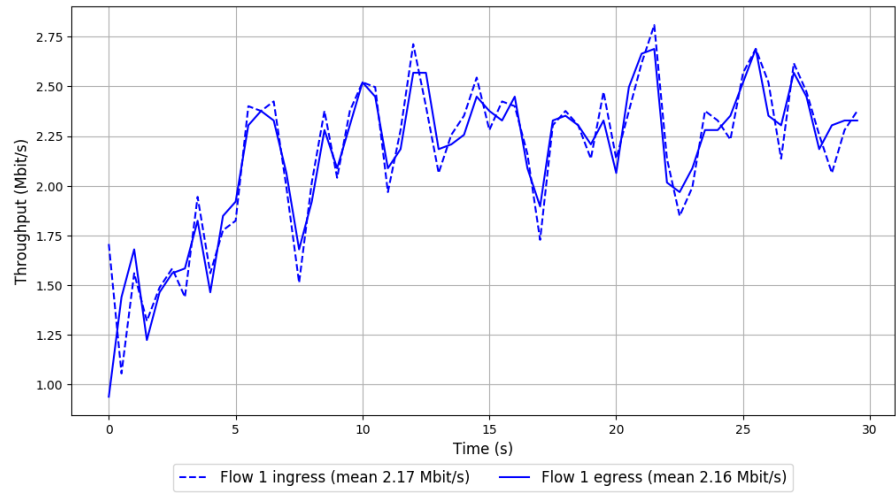

Flow 1 (95th percentile 142.38 ms)

```
Run 3: Statistics of TCP Vegas

Start at: 2018-04-16 21:26:11
End at: 2018-04-16 21:26:41
Local clock offset: 2.434 ms
Remote clock offset: -11.134 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 140.679 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 140.679 ms
Loss rate: 0.33%
```

Run 3: Report of TCP Vegas — Data Link

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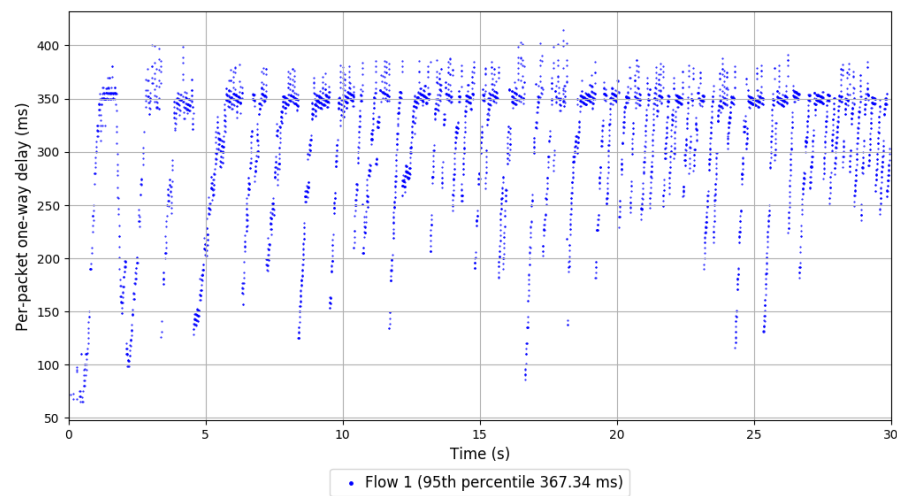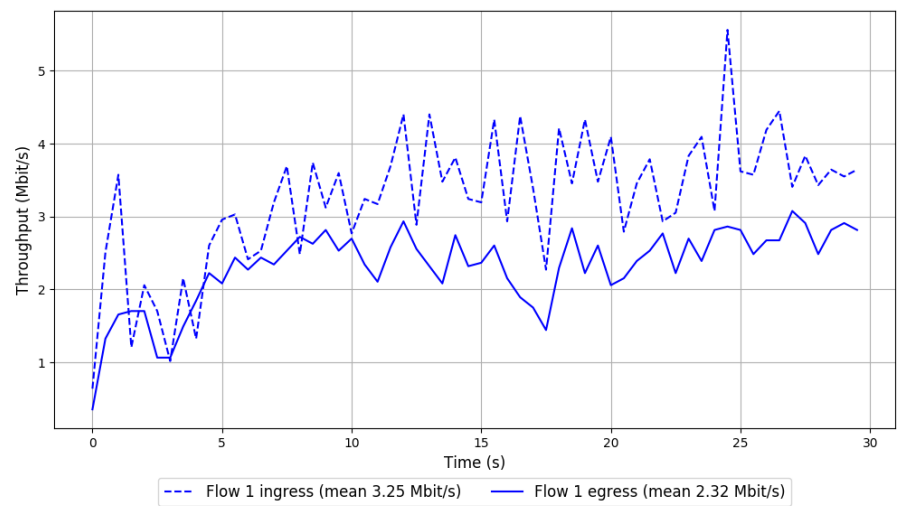

Flow 1 (95th percentile 140.68 ms)

```
Run 1: Statistics of Verus

Start at: 2018-04-16 21:01:09
End at: 2018-04-16 21:01:39
Local clock offset: -1.585 ms
Remote clock offset: -17.483 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 367.337 ms
Loss rate: 28.77%
-- Flow 1:
Average throughput: 2.32 Mbit/s
95th percentile per-packet one-way delay: 367.337 ms
Loss rate: 28.77%
```

Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 3.25 Mbit/s)   Flow 1 egress (mean 2.32 Mbit/s)

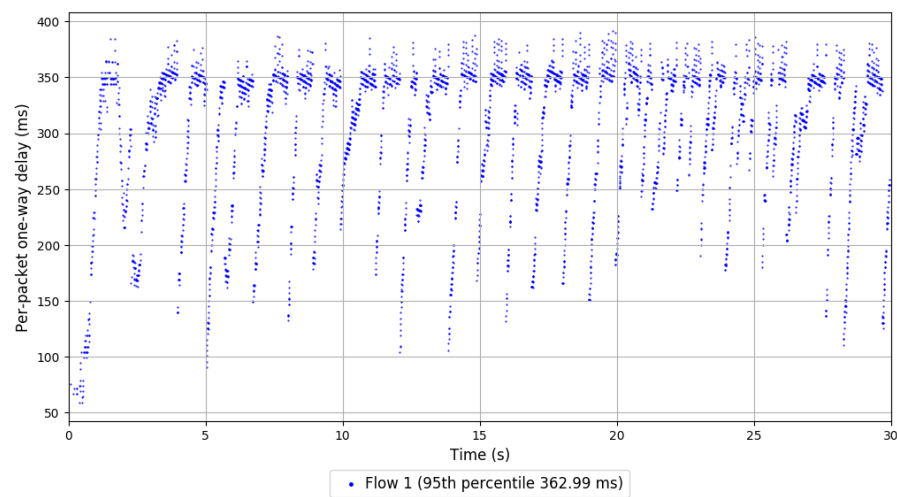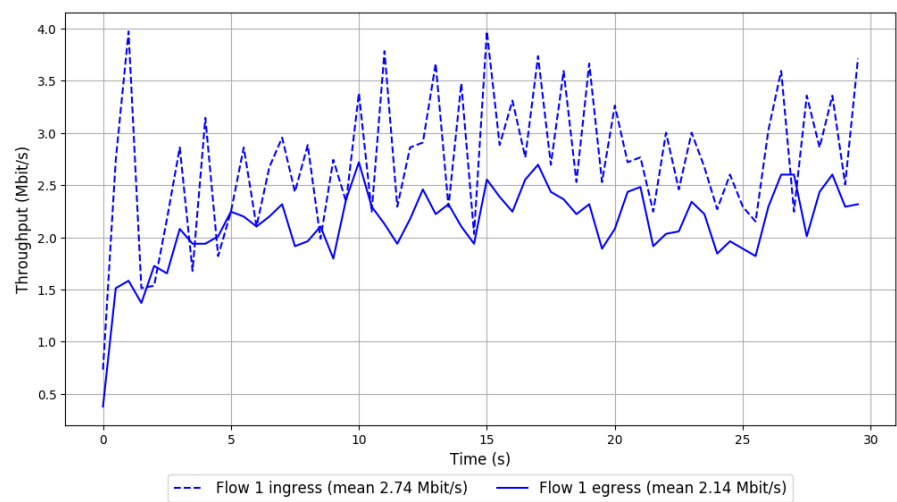• Flow 1 (95th percentile 367.34 ms)

```
Run 2: Statistics of Verus

Start at: 2018-04-16 21:19:40
End at: 2018-04-16 21:20:10
Local clock offset: -1.107 ms
Remote clock offset: -12.253 ms


# Below is generated by plot.py at 2018-04-16 22:38:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 362.985 ms
Loss rate: 22.26%
-- Flow 1:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 362.985 ms
Loss rate: 22.26%
```
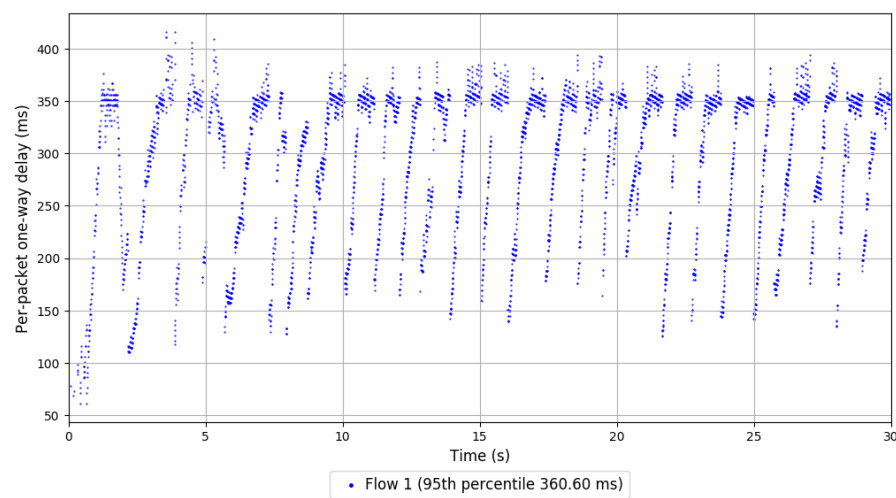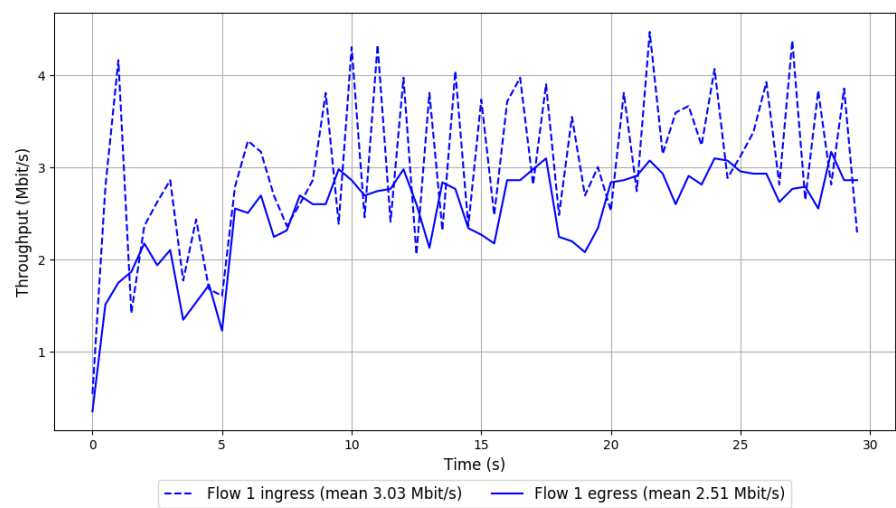
Run 2: Report of Verus — Data Link

```
Run 3: Statistics of Verus

Start at: 2018-04-16 21:38:08
End at: 2018-04-16 21:38:38
Local clock offset: 2.304 ms
Remote clock offset: -10.615 ms

# Below is generated by plot.py at 2018-04-16 22:38:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.51 Mbit/s
95th percentile per-packet one-way delay: 360.597 ms
Loss rate: 17.44%
-- Flow 1:
Average throughput: 2.51 Mbit/s
95th percentile per-packet one-way delay: 360.597 ms
Loss rate: 17.44%
```

Run 3: Report of Verus — Data Link

Flow 1 ingress (mean 3.03 Mbit/s)   Flow 1 egress (mean 2.51 Mbit/s)

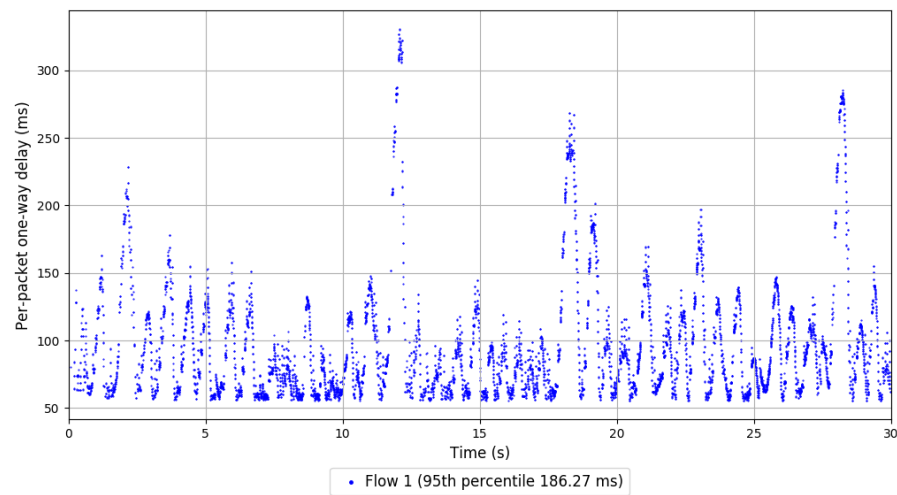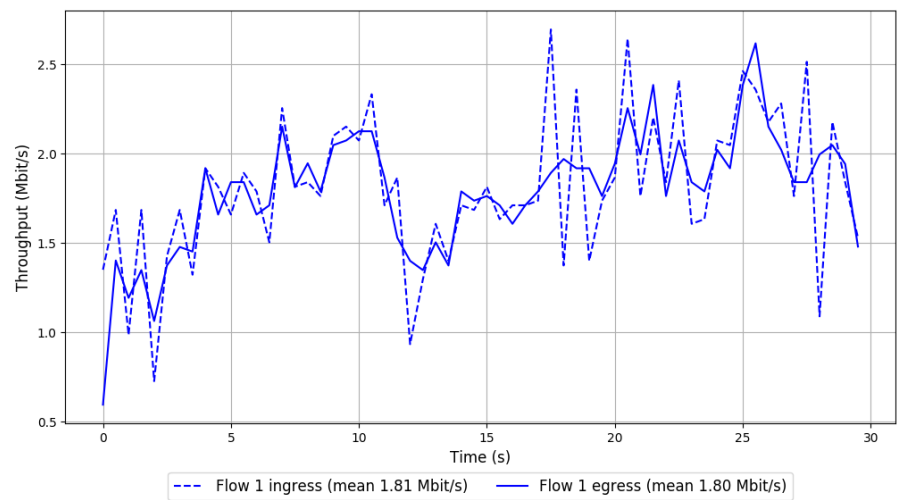• Flow 1 (95th percentile 360.60 ms)

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```
Run 1: Statistics of Copa

Start at: 2018-04-16 20:47:01
End at: 2018-04-16 20:47:31
Local clock offset: 3.841 ms
Remote clock offset: -13.796 ms


# Below is generated by plot.py at 2018-04-16 22:38:24
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 186.266 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 186.266 ms
Loss rate: 0.86%
```

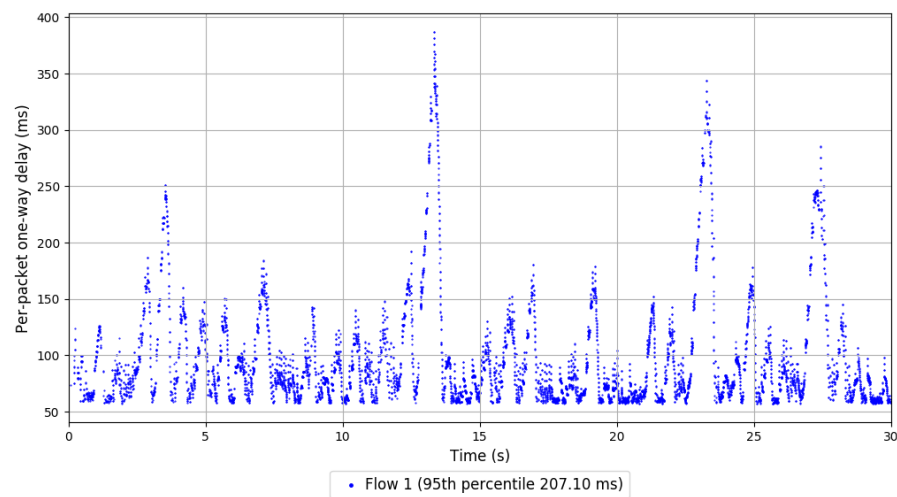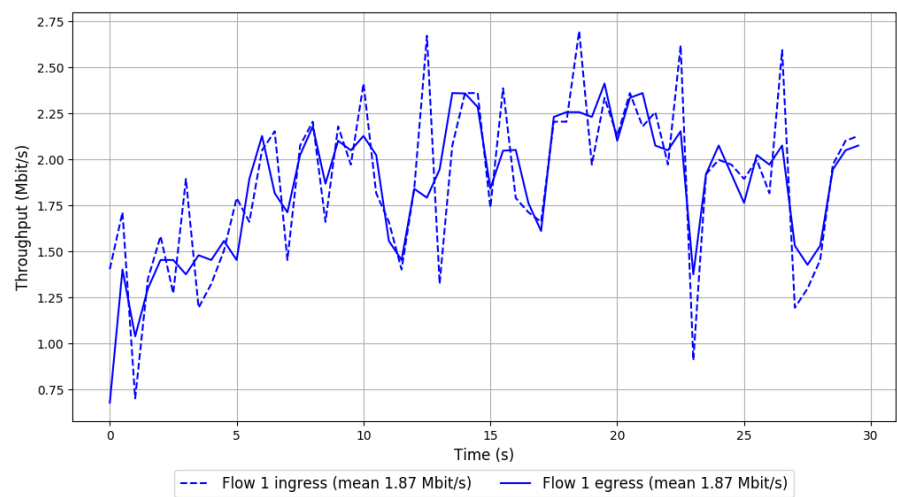Run 1: Report of Copa — Data Link

```
Run 2: Statistics of Copa

Start at: 2018-04-16 21:05:30
End at: 2018-04-16 21:06:00
Local clock offset: -1.817 ms
Remote clock offset: -18.599 ms

# Below is generated by plot.py at 2018-04-16 22:38:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 207.104 ms
Loss rate: 0.81%
-- Flow 1:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 207.104 ms
Loss rate: 0.81%
```

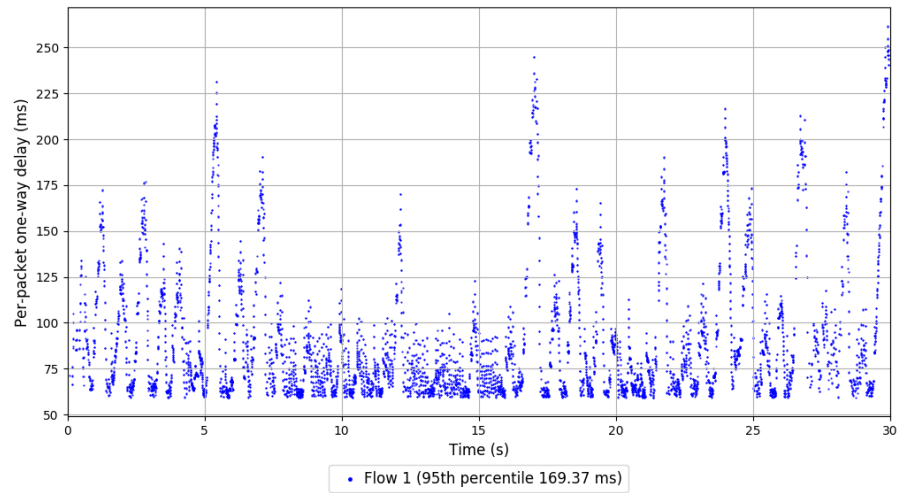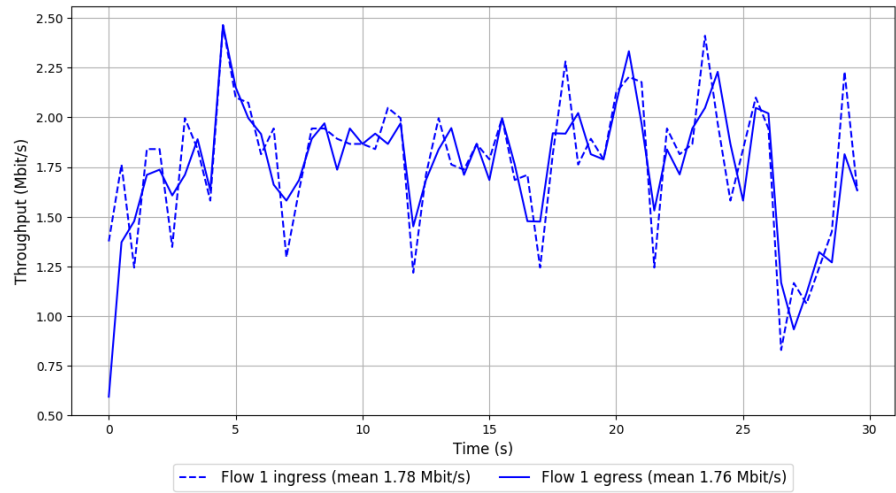# Run 2: Report of Copa — Data Link

```
Run 3: Statistics of Copa

Start at: 2018-04-16 21:24:00
End at: 2018-04-16 21:24:30
Local clock offset: 0.929 ms
Remote clock offset: -12.156 ms


# Below is generated by plot.py at 2018-04-16 22:38:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 169.372 ms
Loss rate: 1.37%
-- Flow 1:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 169.372 ms
Loss rate: 1.37%
```
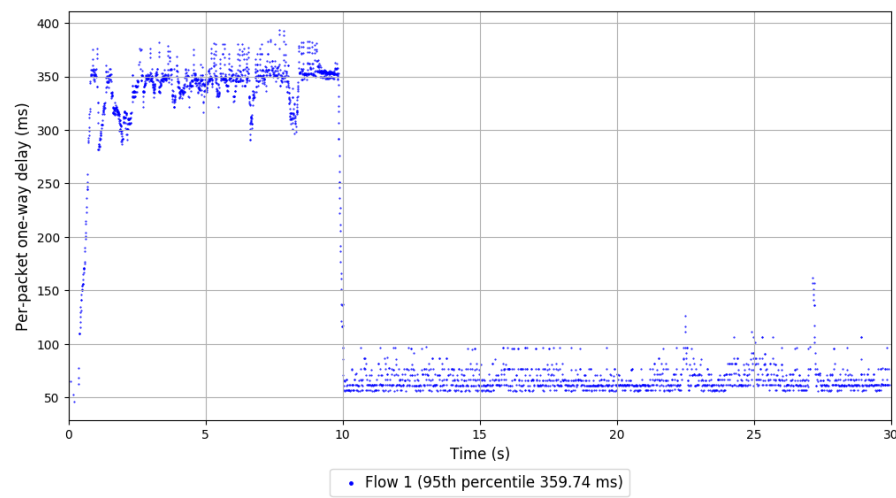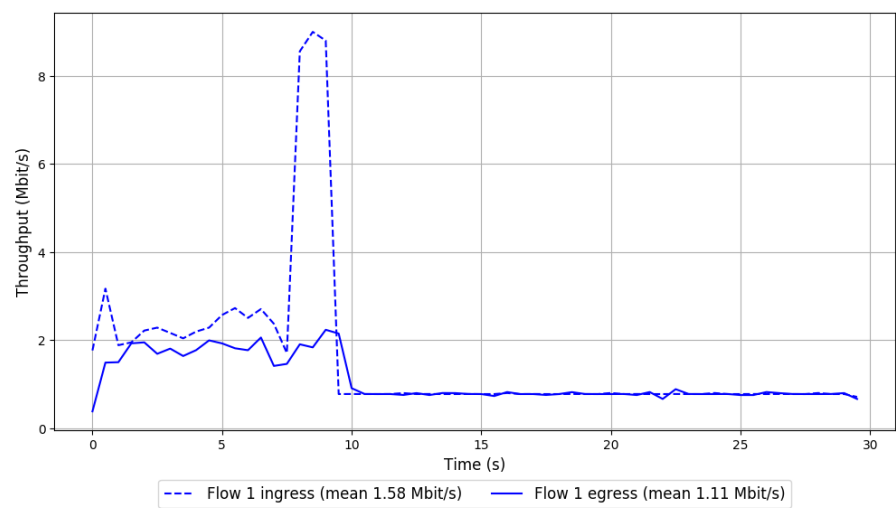
Run 3: Report of Copa — Data Link

```
Run 1: Statistics of FillP

Start at: 2018-04-16 20:53:33
End at: 2018-04-16 20:54:03
Local clock offset: 2.853 ms
Remote clock offset: -15.15 ms


# Below is generated by plot.py at 2018-04-16 22:38:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 359.736 ms
Loss rate: 30.38%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 359.736 ms
Loss rate: 30.38%
```

Run 1: Report of FillP — Data Link

Flow 1 ingress (mean 1.58 Mbit/s)   Flow 1 egress (mean 1.11 Mbit/s)
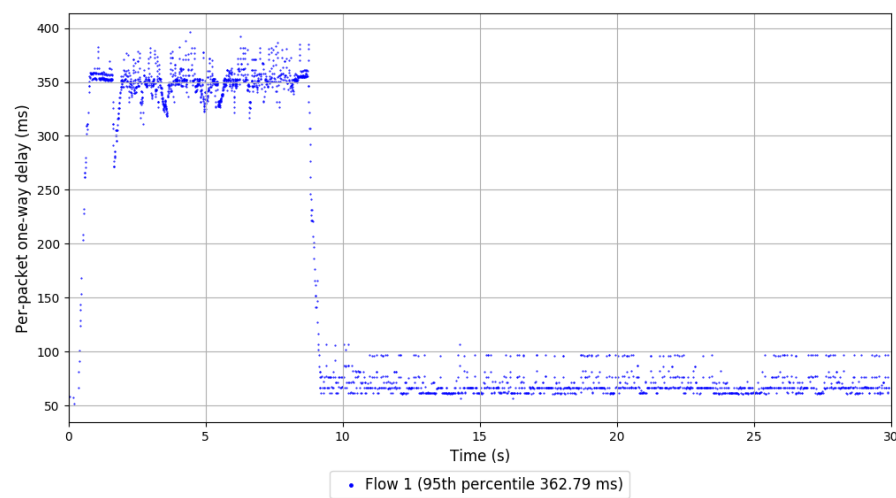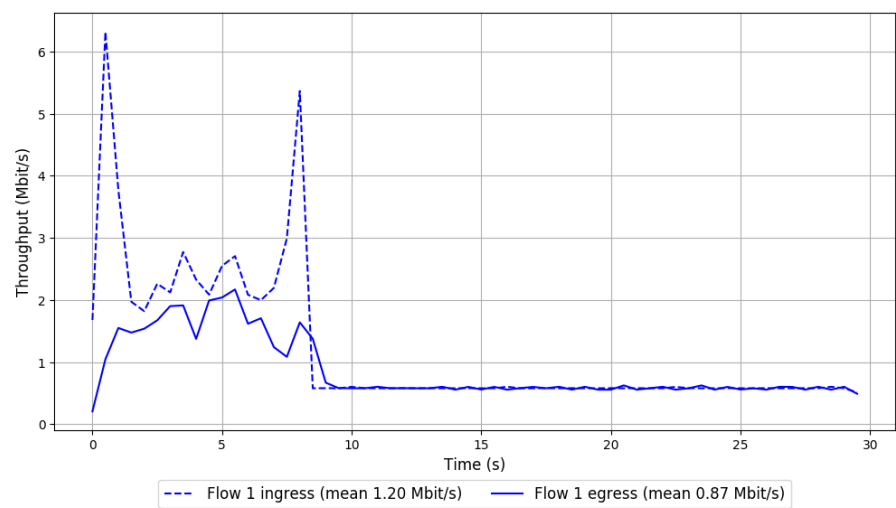

Flow 1 (95th percentile 359.74 ms)

```
Run 2: Statistics of FillP

Start at: 2018-04-16 21:12:02
End at: 2018-04-16 21:12:32
Local clock offset: -2.228 ms
Remote clock offset: -17.654 ms


# Below is generated by plot.py at 2018-04-16 22:38:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 362.791 ms
Loss rate: 27.76%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 362.791 ms
Loss rate: 27.76%
```
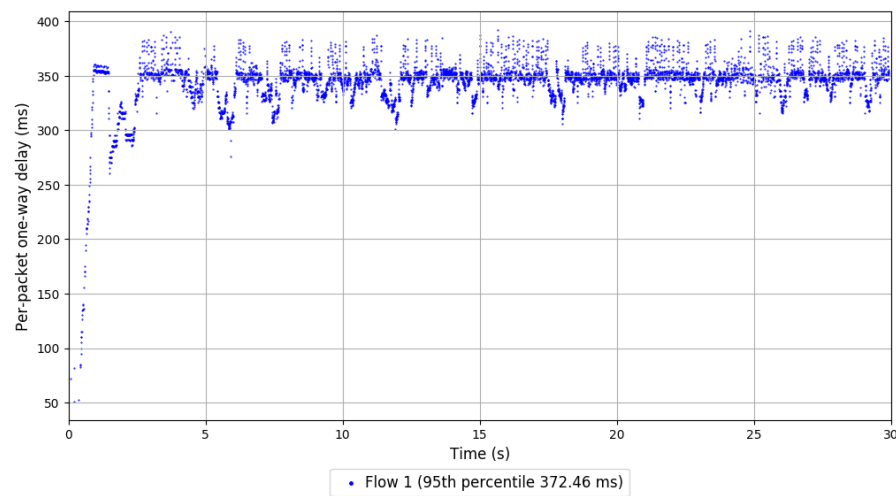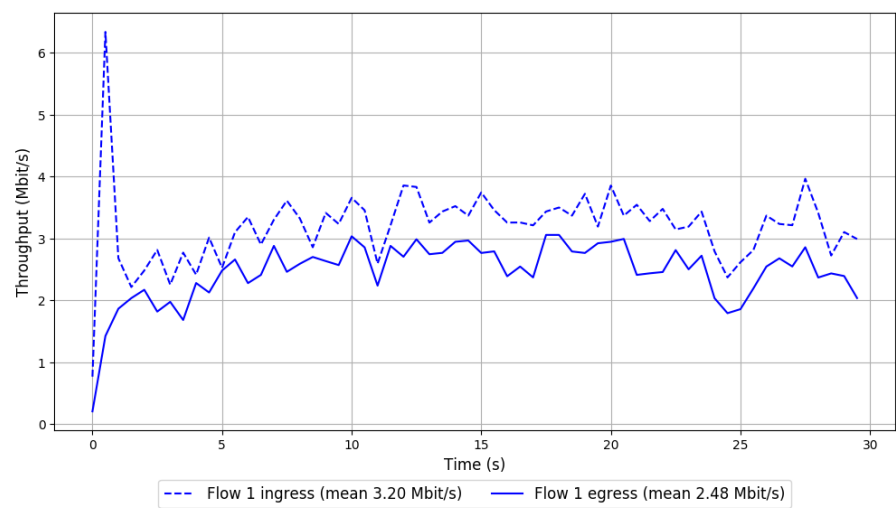
Run 2: Report of FillP — Data Link

```
Run 3: Statistics of FillP

Start at: 2018-04-16 21:30:32
End at: 2018-04-16 21:31:02
Local clock offset: -1.401 ms
Remote clock offset: -11.263 ms


# Below is generated by plot.py at 2018-04-16 22:38:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 372.458 ms
Loss rate: 22.82%
-- Flow 1:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 372.458 ms
Loss rate: 22.82%
```
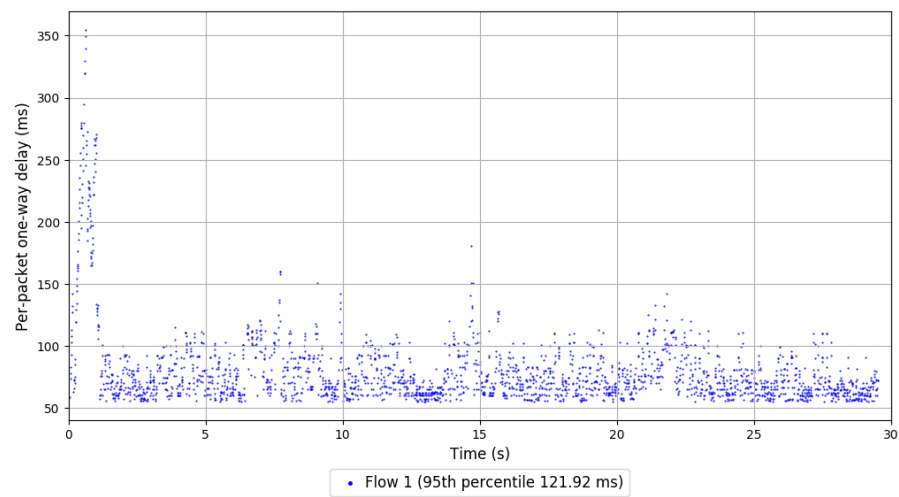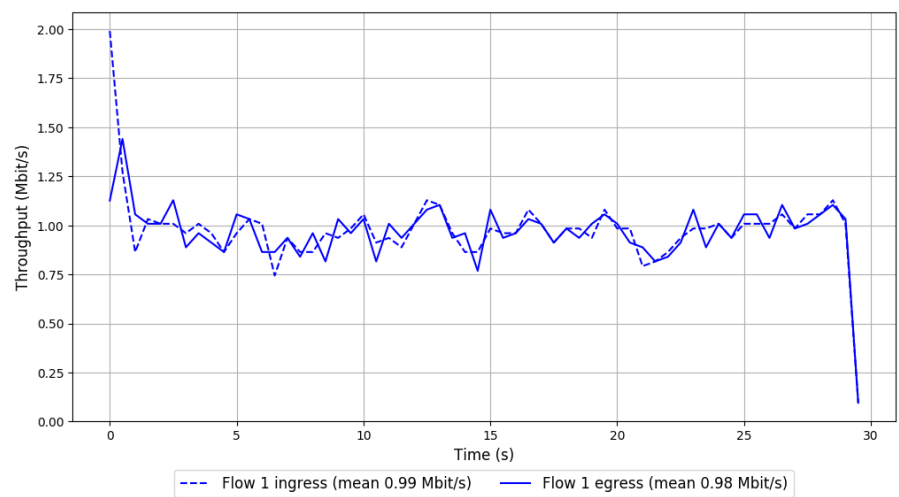
Run 3: Report of FillP — Data Link

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

Start at: 2018-04-16 20:48:06
End at: 2018-04-16 20:48:36
Local clock offset: 3.596 ms
Remote clock offset: -14.646 ms

# Below is generated by plot.py at 2018-04-16 22:38:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 121.921 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 121.921 ms
Loss rate: 0.90%
```

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

Flow 1 ingress (mean 0.99 Mbit/s) —— Flow 1 egress (mean 0.98 Mbit/s)

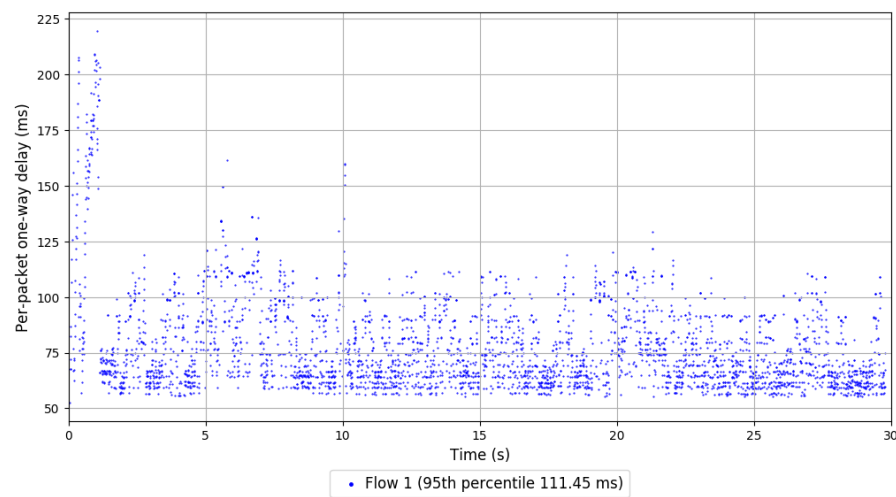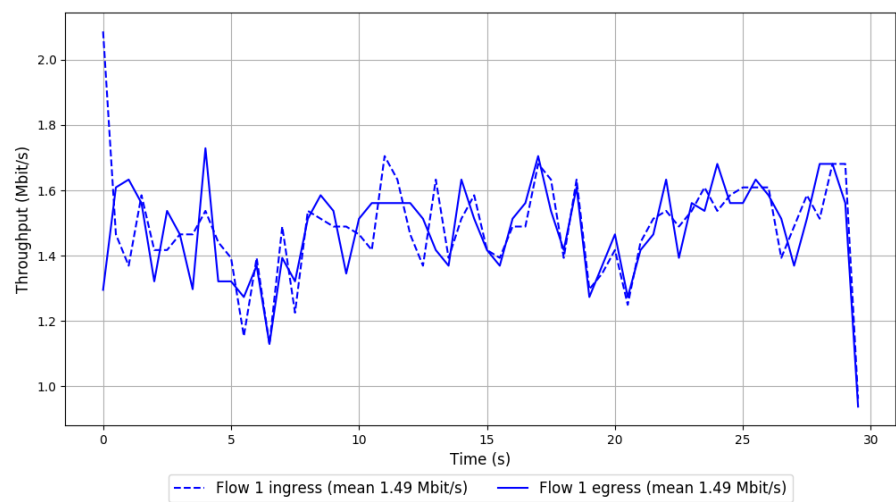
• Flow 1 (95th percentile 121.92 ms)

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

Start at: 2018-04-16 21:06:36
End at: 2018-04-16 21:07:06
Local clock offset: -3.347 ms
Remote clock offset: -18.655 ms

# Below is generated by plot.py at 2018-04-16 22:38:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 111.446 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 111.446 ms
Loss rate: 0.57%
```

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

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

Start at: 2018-04-16 21:25:06
End at: 2018-04-16 21:25:36
Local clock offset: -2.23 ms
Remote clock offset: -10.431 ms


# Below is generated by plot.py at 2018-04-16 22:38:28
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 109.687 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 1.31 Mbit/s
95th percentile per-packet one-way delay: 109.687 ms
Loss rate: 0.76%
```
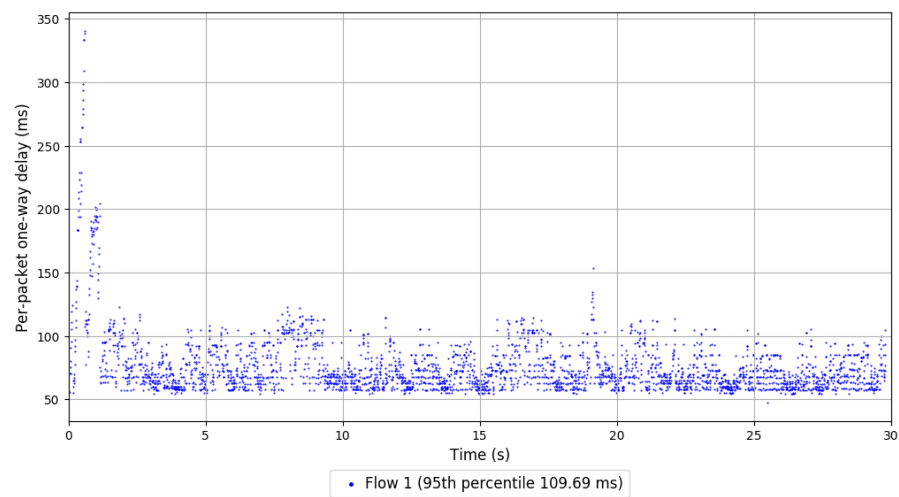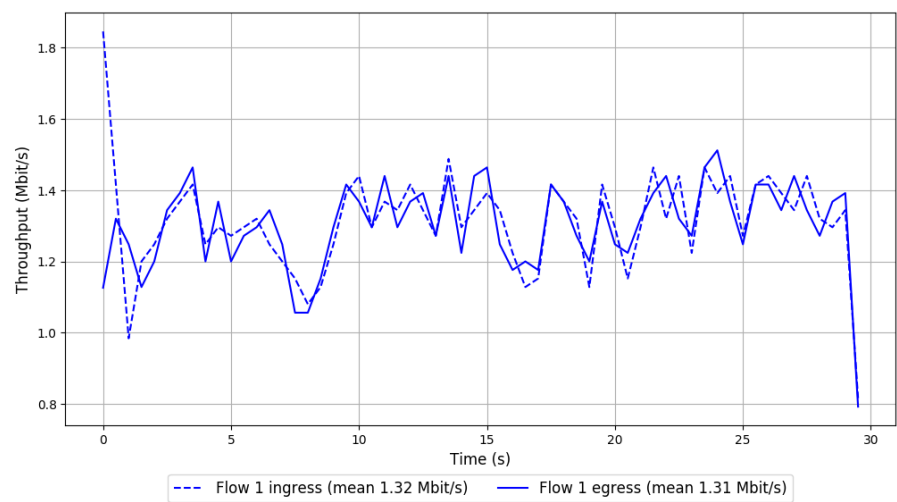
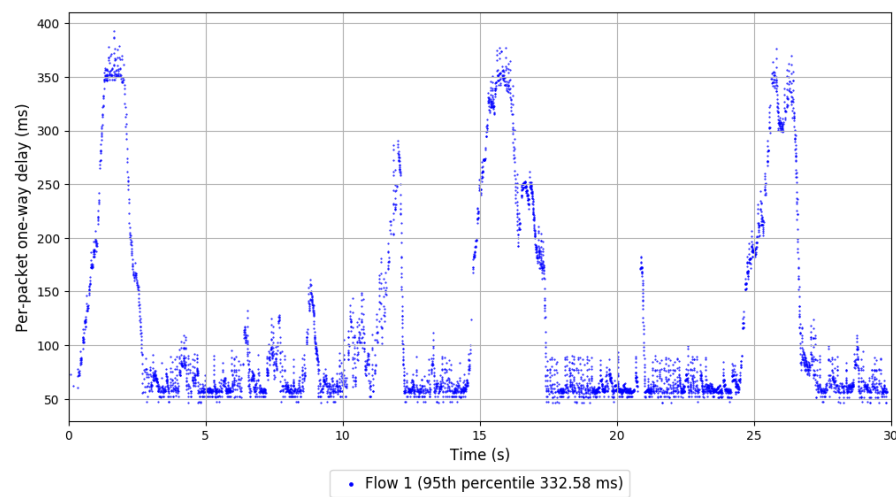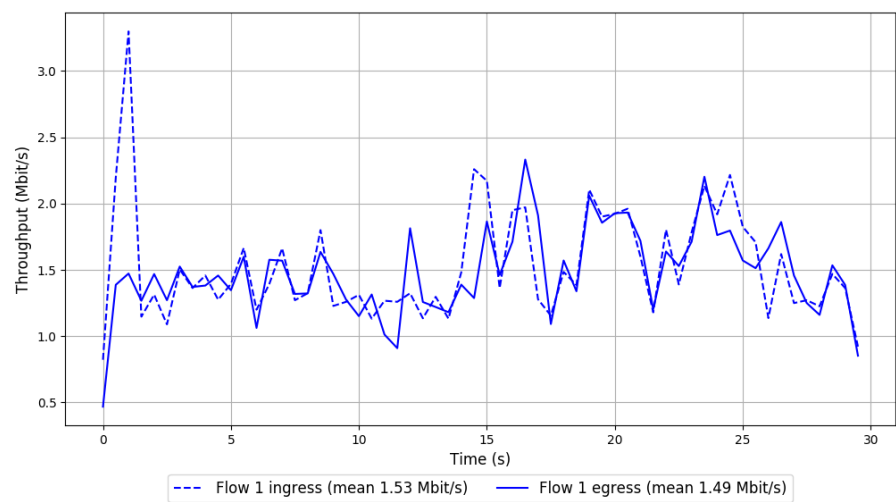## Run 3: Report of Indigo-1-32 — Data Link

```
Run 1: Statistics of PCC-Vivace

Start at: 2018-04-16 20:50:16
End at: 2018-04-16 20:50:46
Local clock offset: 4.302 ms
Remote clock offset: -14.529 ms


# Below is generated by plot.py at 2018-04-16 22:38:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 332.579 ms
Loss rate: 3.36%
-- Flow 1:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 332.579 ms
Loss rate: 3.36%
```

Run 1: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.53 Mbit/s) — — — Flow 1 egress (mean 1.49 Mbit/s) ———
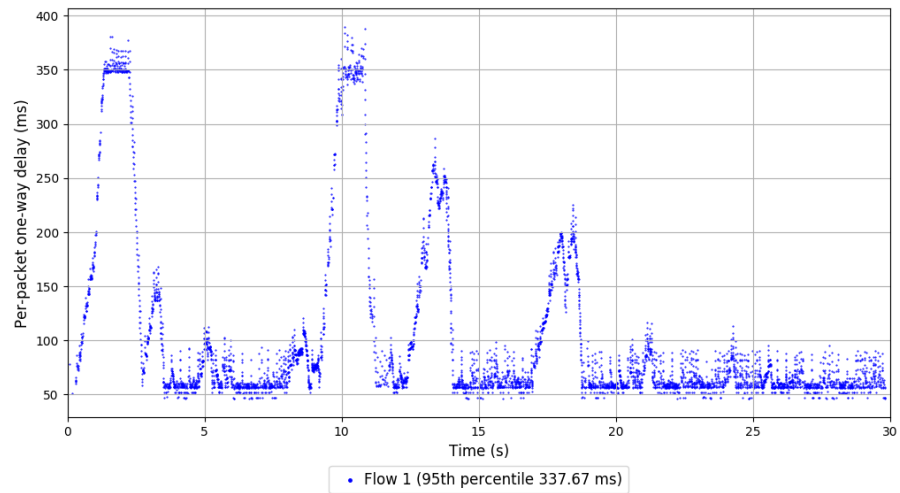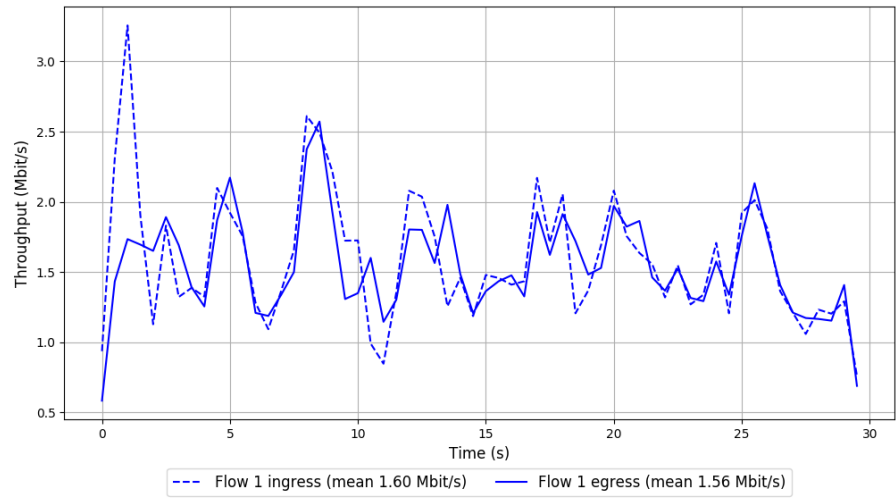

Flow 1 (95th percentile 332.58 ms)

```
Run 2: Statistics of PCC-Vivace

Start at: 2018-04-16 21:08:46
End at: 2018-04-16 21:09:17
Local clock offset: -2.945 ms
Remote clock offset: -18.19 ms


# Below is generated by plot.py at 2018-04-16 22:38:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 337.672 ms
Loss rate: 2.69%
-- Flow 1:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 337.672 ms
Loss rate: 2.69%
```

Run 2: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.60 Mbit/s) --- Flow 1 egress (mean 1.56 Mbit/s)
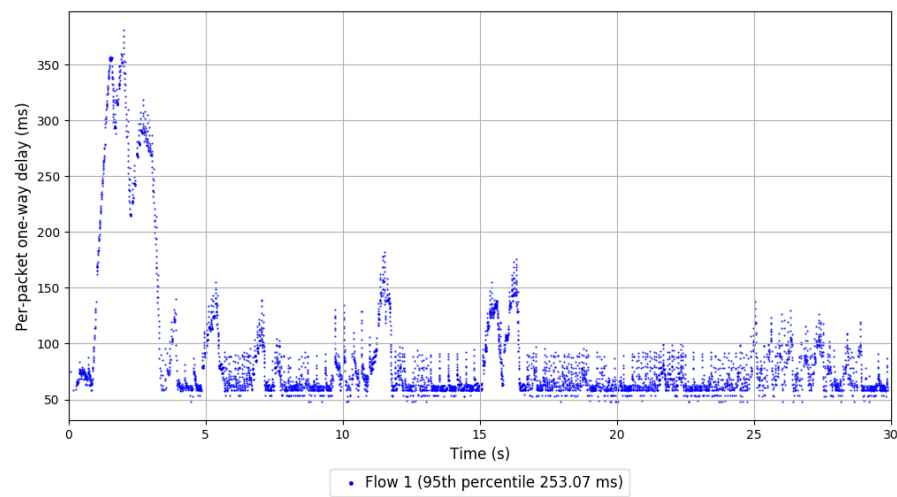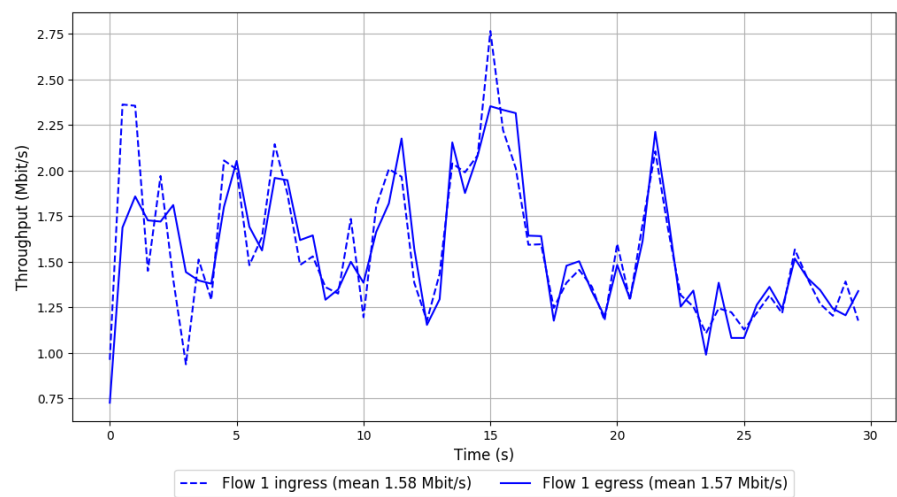

Flow 1 (95th percentile 337.67 ms)

```
Run 3: Statistics of PCC-Vivace

Start at: 2018-04-16 21:27:16
End at: 2018-04-16 21:27:46
Local clock offset: 1.011 ms
Remote clock offset: -10.479 ms

# Below is generated by plot.py at 2018-04-16 22:38:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 253.074 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 1.57 Mbit/s
95th percentile per-packet one-way delay: 253.074 ms
Loss rate: 0.48%
```

Run 3: Report of PCC-Vivace — Data Link

Flow 1 ingress (mean 1.58 Mbit/s) ----   Flow 1 egress (mean 1.57 Mbit/s) ——

Flow 1 (95th percentile 253.07 ms)

```
Run 1: Statistics of PCC-Expr

Start at: 2018-04-16 21:03:20
End at: 2018-04-16 21:03:50
Local clock offset: -3.255 ms
Remote clock offset: -17.583 ms
```

Run 1: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

```
Run 2: Statistics of PCC-Expr

Start at: 2018-04-16 21:21:50
End at: 2018-04-16 21:22:20
Local clock offset: -1.504 ms
Remote clock offset: -12.1 ms
```

Run 2: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing

```
Run 3: Statistics of PCC-Expr

Start at: 2018-04-16 21:40:18
End at: 2018-04-16 21:40:48
Local clock offset: 2.078 ms
Remote clock offset: -9.889 ms
```

Run 3: Report of PCC-Expr — Data Link

Figure is missing

Figure is missing