Pantheon Summary (Generated at Tue, 11 Jul 2017 04:44:52 +0000 with pantheon version `c3610718e2bbac84102e8ac47b889a75d4392d79`)

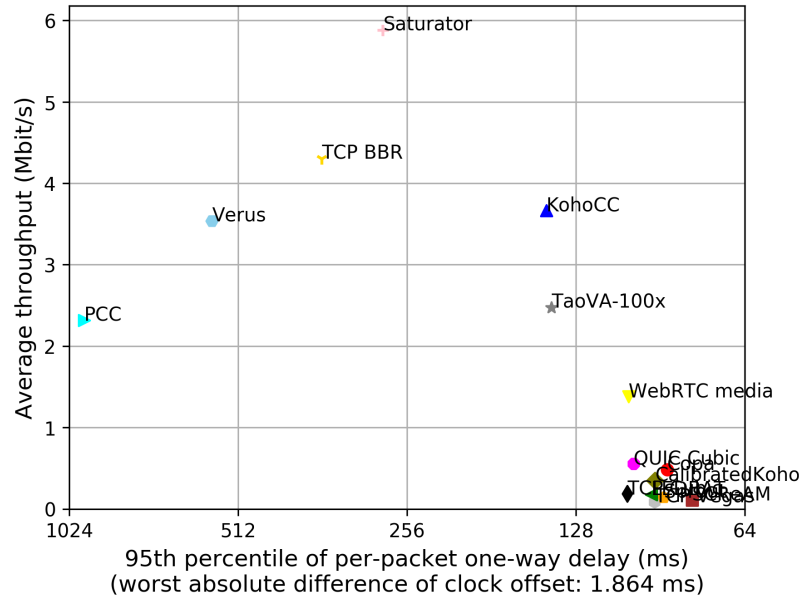   Repeated the test of 15 congestion control schemes once.

    Each test lasted for 30 seconds running 1 flow.

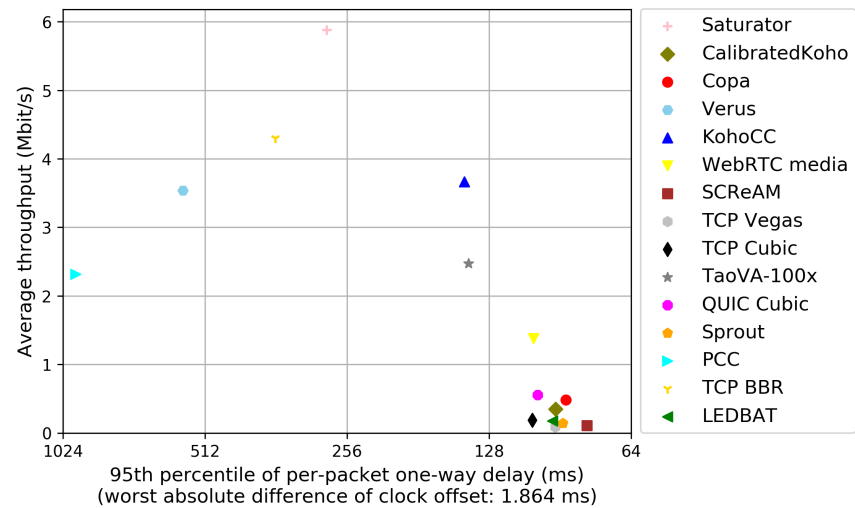   Data path **from** AWS Korea Ethernet **to** China ppp0.

    NTP offset measured against ntp.nict.jp.

```
git branch: master @ c3610718e2bbac84102e8ac47b889a75d4392d79
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
 M datagrump/sender.cc
third_party/genericCC @ dae96123232f1bcb37725348fa2378691ce26725
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
 M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-stimuli @ fc73a85ca16c34366d1888dc8a0d0d88d4ebf2a7
third_party/pantheon-tunnel @ c792f8e8e0704b1646a0e024766675d8e9a835f1
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
 M receiver/src/buffer.h
 M receiver/src/core.cpp
 M sender/src/buffer.h
 M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
 M src/examples/cellsim.cc
 M src/examples/sproutbt2.cc
 M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
 M src/verus.hpp
 M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS Korea Ethernet to China ppp0, 1 run of 30s each per scheme
(mean of all runs by scheme)

test from AWS Korea Ethernet to China ppp0, 1 run 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	1	4.30	363.48	8.39
CalibratedKoho	1	0.35	92.50	1.47
Copa	1	0.48	88.00	1.31
TCP Cubic	1	0.19	103.71	6.70
KohoCC	1	3.66	144.55	2.53
LEDBAT	1	0.18	93.95	7.62
PCC	1	2.31	962.50	2.11
QUIC Cubic	1	0.55	100.95	7.38
Saturator	1	5.88	282.54	2.57
SCReAM	1	0.11	79.50	1.89
Sprout	1	0.14	89.38	2.50
TaoVA-100x	1	2.48	141.62	1.98
TCP Vegas	1	0.08	92.68	13.18
Verus	1	3.54	570.01	7.45
WebRTC media	1	1.38	103.10	7.33

```
Run 1: Statistics of TCP BBR

Start at: Tue, 11 Jul 2017 04:19:23 +0000
End at: Tue, 11 Jul 2017 04:19:53 +0000
Local clock offset: 1.58 ms
Remote clock offset: -0.122 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:42 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 363.476 ms
Loss rate: 8.39%
-- Flow 1:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 363.476 ms
Loss rate: 8.39%
```
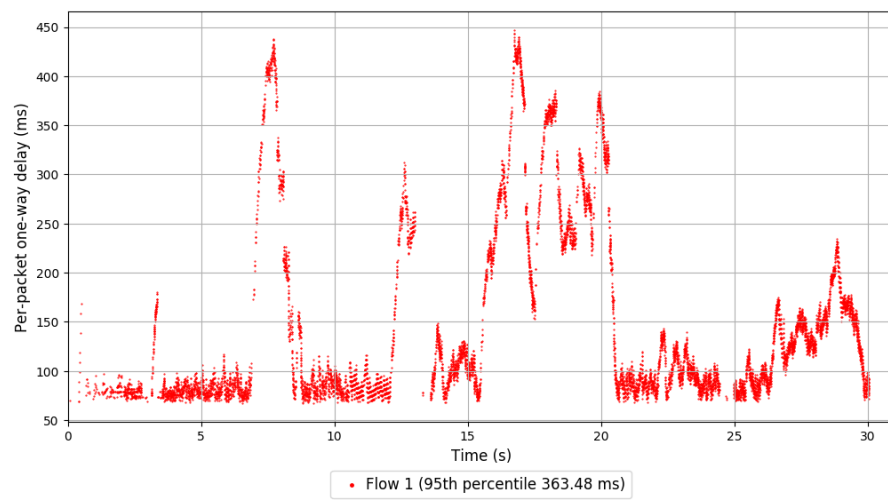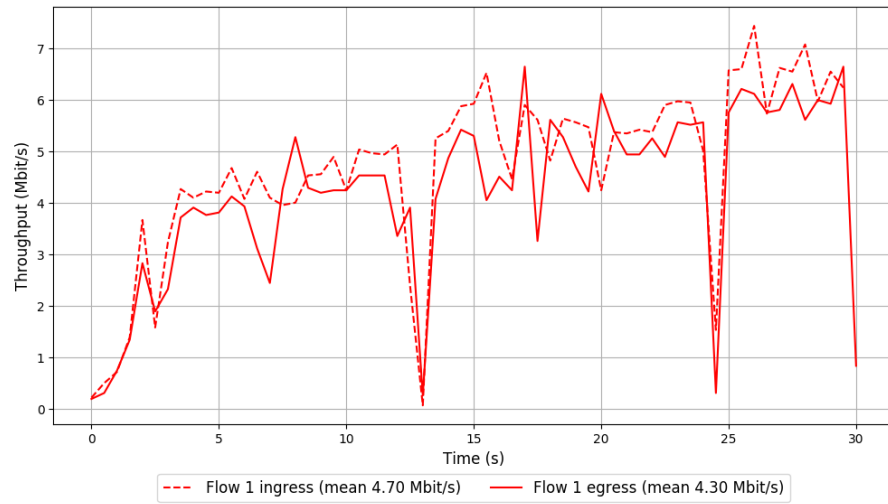
Run 1: Report of TCP BBR — Data Link

```
Run 1: Statistics of CalibratedKoho

Start at: Tue, 11 Jul 2017 04:13:28 +0000
End at: Tue, 11 Jul 2017 04:13:58 +0000
Local clock offset: 0.225 ms
Remote clock offset: -0.159 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:42 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 92.500 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 92.500 ms
Loss rate: 1.47%
```
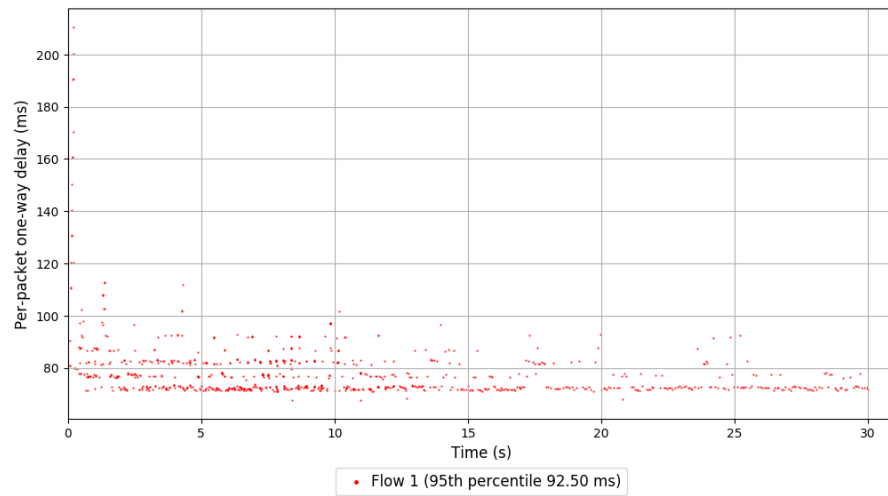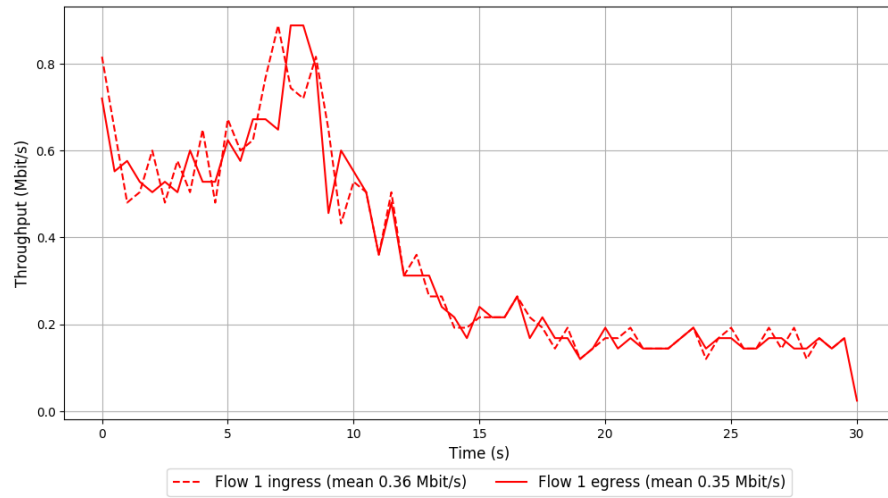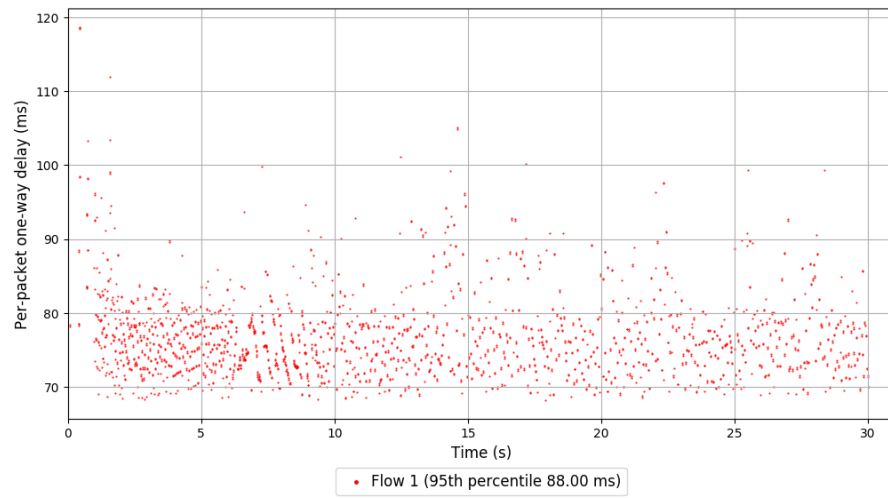
Run 1: Report of CalibratedKoho — Data Link

```
Run 1: Statistics of Copa

Start at: Tue, 11 Jul 2017 04:15:54 +0000
End at: Tue, 11 Jul 2017 04:16:24 +0000
Local clock offset: -0.52 ms
Remote clock offset: -0.109 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:42 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 88.004 ms
Loss rate: 1.31%
-- Flow 1:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 88.004 ms
Loss rate: 1.31%
```
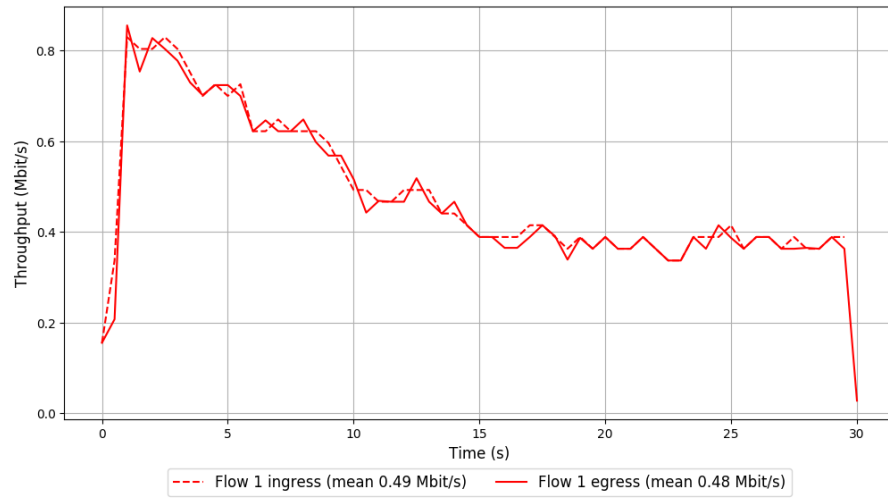
Run 1: Report of Copa — Data Link

```
Run 1: Statistics of TCP Cubic

Start at: Tue, 11 Jul 2017 04:18:13 +0000
End at: Tue, 11 Jul 2017 04:18:43 +0000
Local clock offset: 1.333 ms
Remote clock offset: -0.012 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:43 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 103.706 ms
Loss rate: 6.70%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 103.706 ms
Loss rate: 6.70%
```
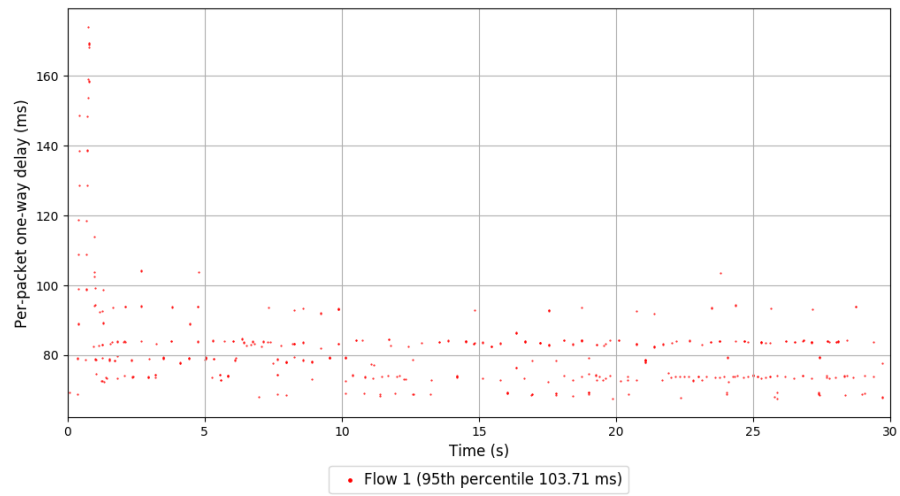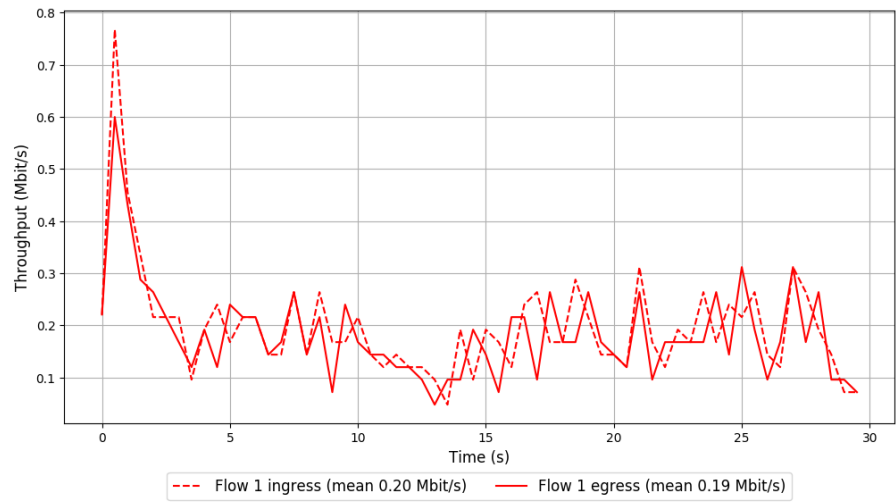
Run 1: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.20 Mbit/s)   Flow 1 egress (mean 0.19 Mbit/s)

Flow 1 (95th percentile 103.71 ms)

```
Run 1: Statistics of KohoCC

Start at: Tue, 11 Jul 2017 04:14:38 +0000
End at: Tue, 11 Jul 2017 04:15:08 +0000
Local clock offset: 1.239 ms
Remote clock offset: -0.118 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:44 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 144.553 ms
Loss rate: 2.53%
-- Flow 1:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 144.553 ms
Loss rate: 2.53%
```
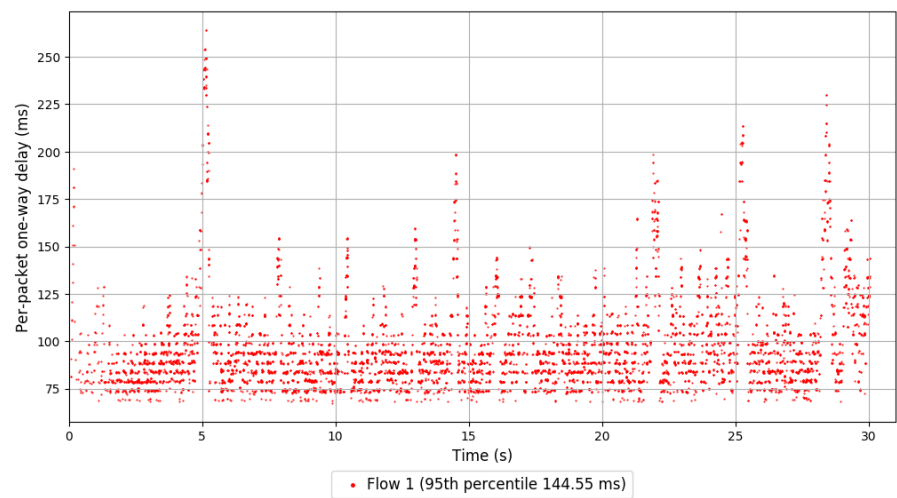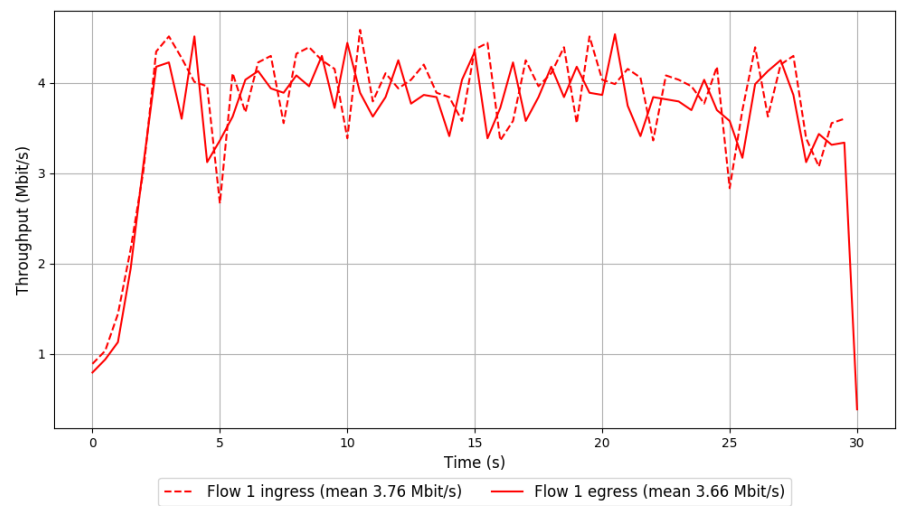
Run 1: Report of KohoCC — Data Link

13

```
Run 1: Statistics of LEDBAT

Start at: Tue, 11 Jul 2017 04:12:18 +0000
End at: Tue, 11 Jul 2017 04:12:48 +0000
Local clock offset: 0.253 ms
Remote clock offset: -0.13 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:44 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 93.947 ms
Loss rate: 7.62%
-- Flow 1:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 93.947 ms
Loss rate: 7.62%
```
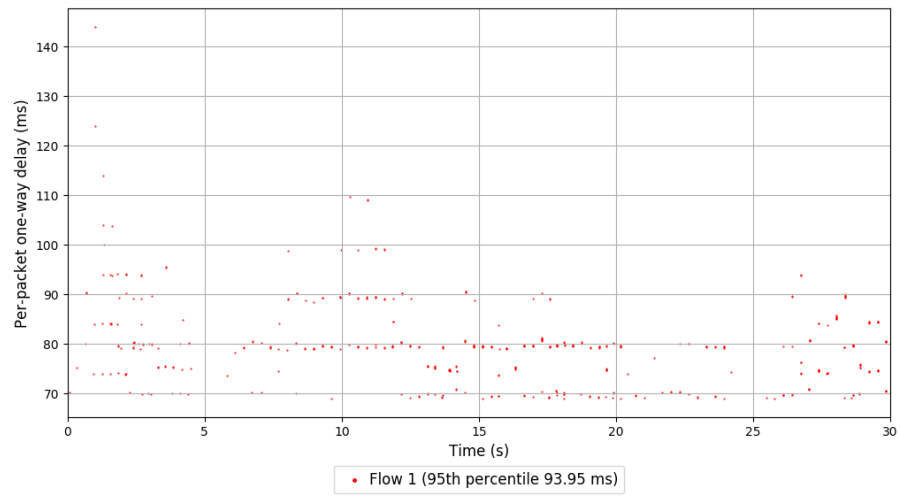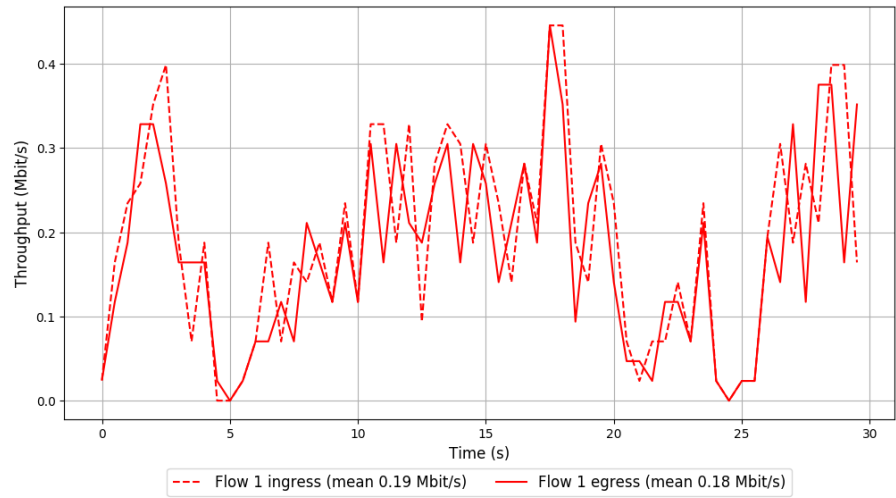
Run 1: Report of LEDBAT — Data Link

```
Run 1: Statistics of PCC

Start at: Tue, 11 Jul 2017 04:22:55 +0000
End at: Tue, 11 Jul 2017 04:23:25 +0000
Local clock offset: 1.67 ms
Remote clock offset: -0.194 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:45 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 962.495 ms
Loss rate: 2.11%
-- Flow 1:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 962.495 ms
Loss rate: 2.11%
```
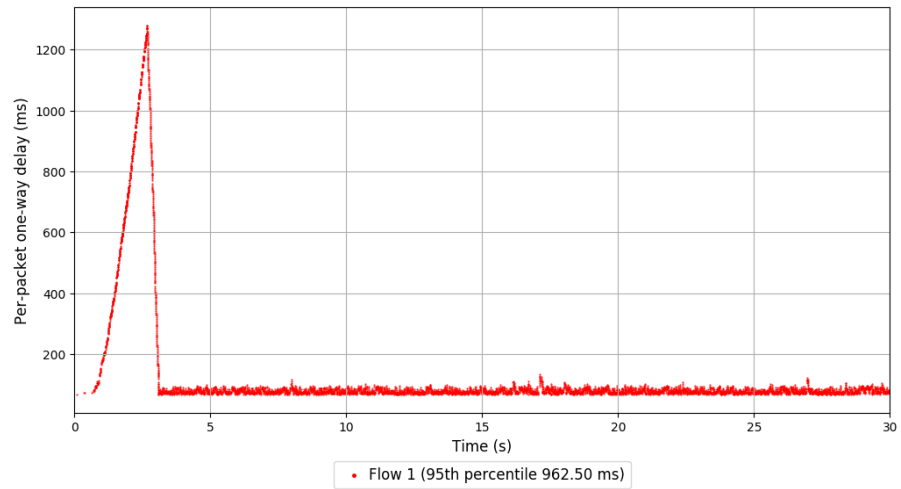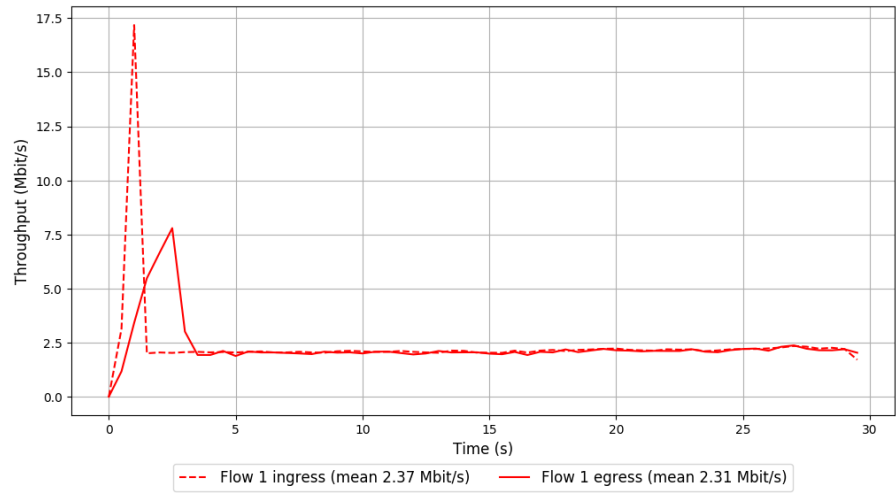
Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 2.37 Mbit/s)   Flow 1 egress (mean 2.31 Mbit/s)

Flow 1 (95th percentile 962.50 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: Tue, 11 Jul 2017 04:26:25 +0000
End at: Tue, 11 Jul 2017 04:26:55 +0000
Local clock offset: 0.135 ms
Remote clock offset: -0.199 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:45 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 100.947 ms
Loss rate: 7.38%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 100.947 ms
Loss rate: 7.38%
```
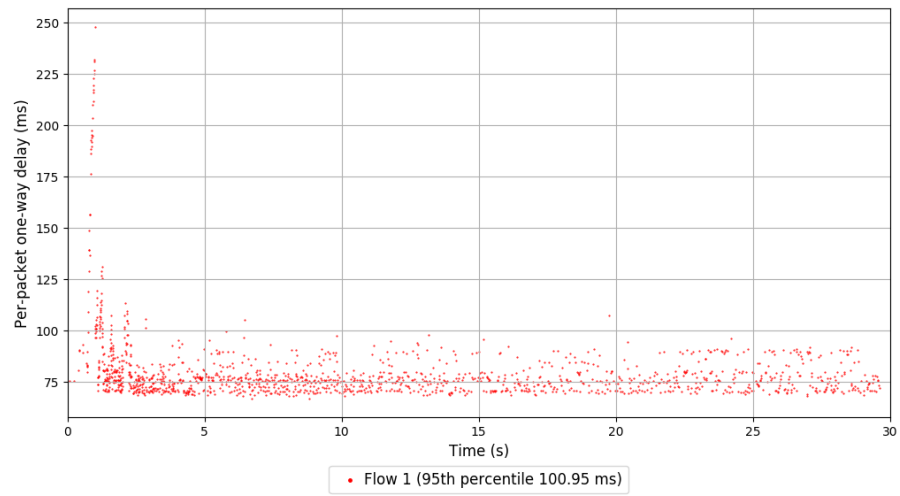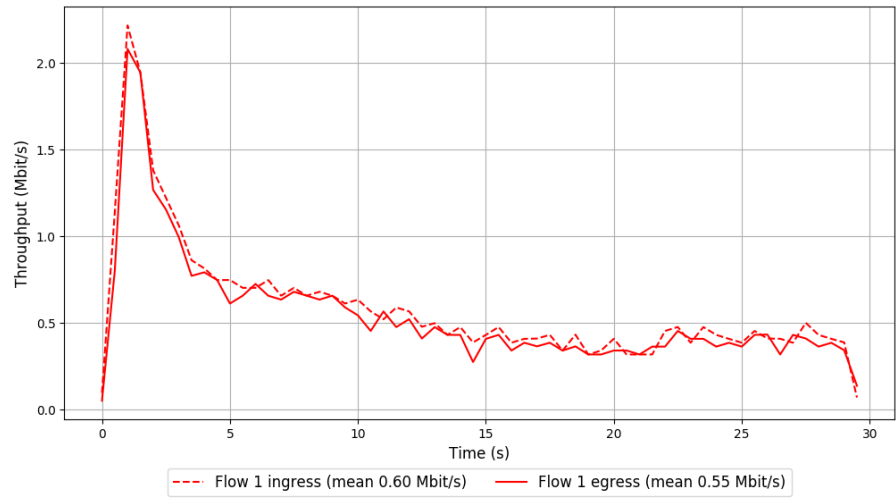
Run 1: Report of QUIC Cubic — Data Link

```
Run 1: Statistics of Saturator

Start at: Tue, 11 Jul 2017 04:09:56 +0000
End at: Tue, 11 Jul 2017 04:10:27 +0000
Local clock offset: 1.255 ms
Remote clock offset: -0.111 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:47 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.88 Mbit/s
95th percentile per-packet one-way delay: 282.541 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 5.88 Mbit/s
95th percentile per-packet one-way delay: 282.541 ms
Loss rate: 2.57%
```
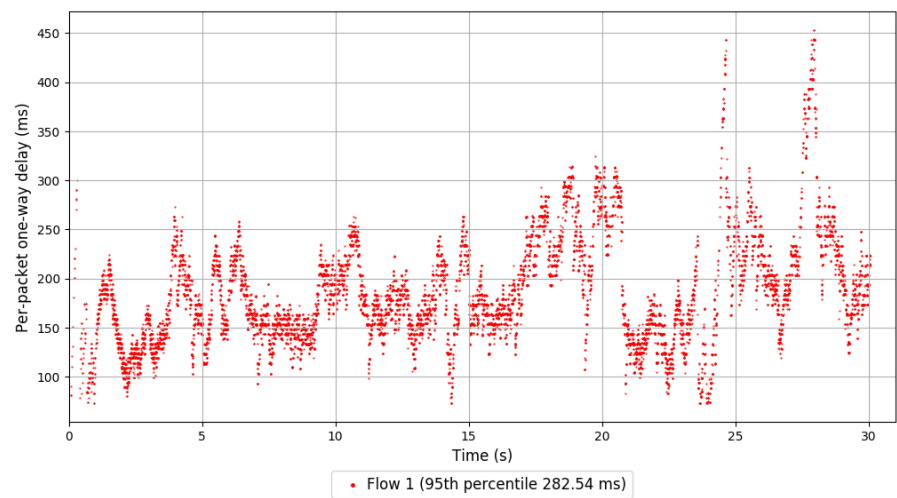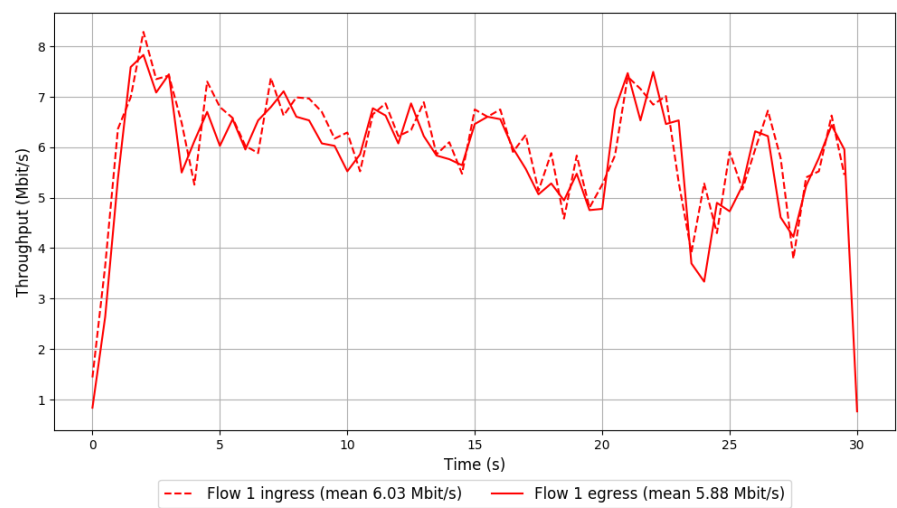
Run 1: Report of Saturator — Data Link

Flow 1 ingress (mean 6.03 Mbit/s) ——— Flow 1 egress (mean 5.88 Mbit/s)

• Flow 1 (95th percentile 282.54 ms)

```
Run 1: Statistics of SCReAM

Start at: Tue, 11 Jul 2017 04:20:34 +0000
End at: Tue, 11 Jul 2017 04:21:04 +0000
Local clock offset: 0.3 ms
Remote clock offset: -0.132 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:47 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 79.502 ms
Loss rate: 1.89%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 79.502 ms
Loss rate: 1.89%
```
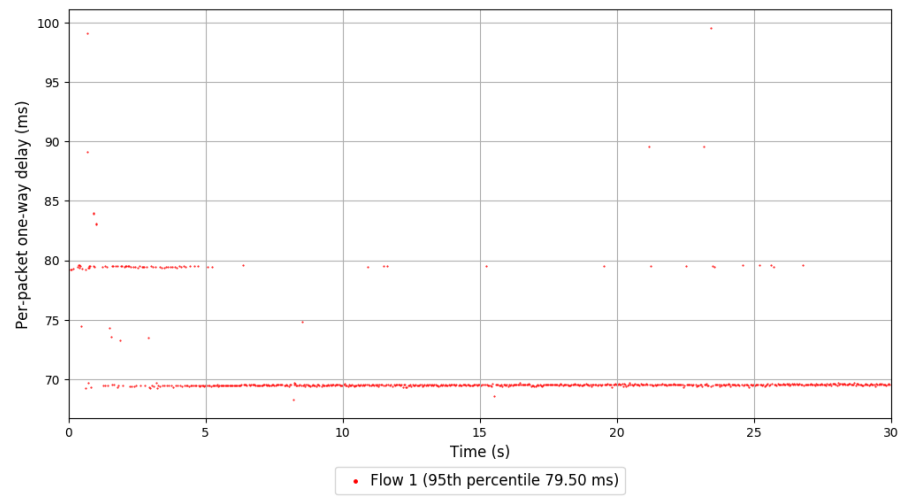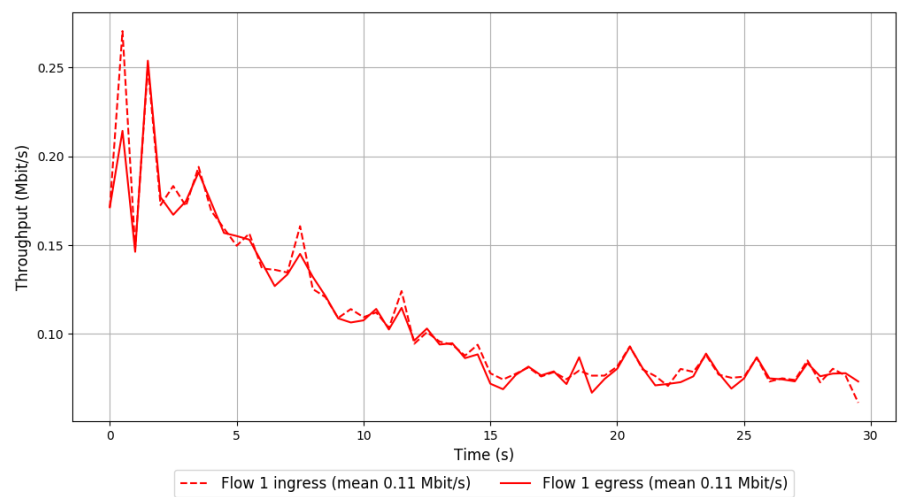
Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.11 Mbit/s)   Flow 1 egress (mean 0.11 Mbit/s)

Flow 1 (95th percentile 79.50 ms)

23

```
Run 1: Statistics of Sprout

Start at: Tue, 11 Jul 2017 04:24:05 +0000
End at: Tue, 11 Jul 2017 04:24:35 +0000
Local clock offset: 1.319 ms
Remote clock offset: -0.208 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:47 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 89.376 ms
Loss rate: 2.50%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 89.376 ms
Loss rate: 2.50%
```
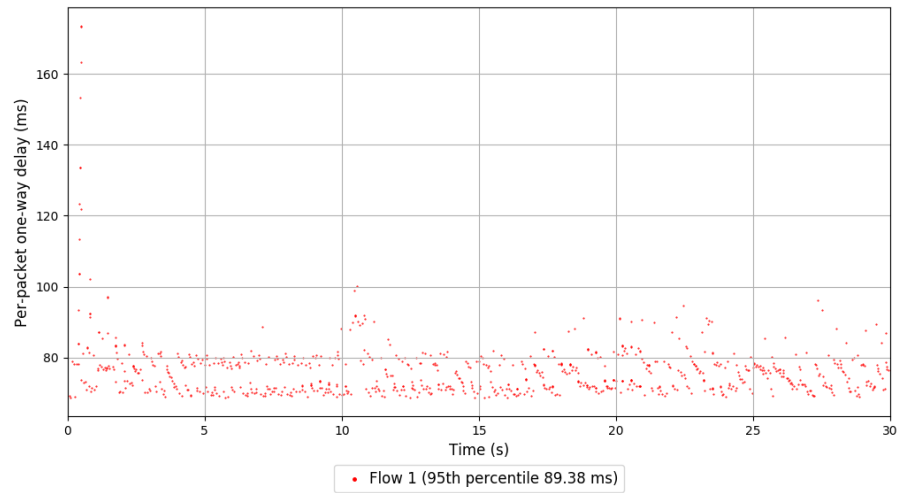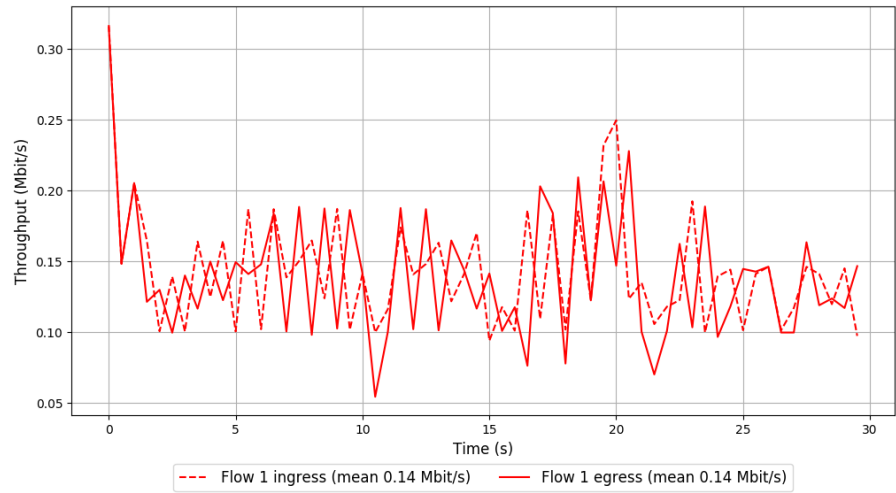
Run 1: Report of Sprout — Data Link

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

Start at: Tue, 11 Jul 2017 04:21:44 +0000
End at: Tue, 11 Jul 2017 04:22:14 +0000
Local clock offset: 0.113 ms
Remote clock offset: -0.111 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:49 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 141.625 ms
Loss rate: 1.98%
-- Flow 1:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 141.625 ms
Loss rate: 1.98%
```
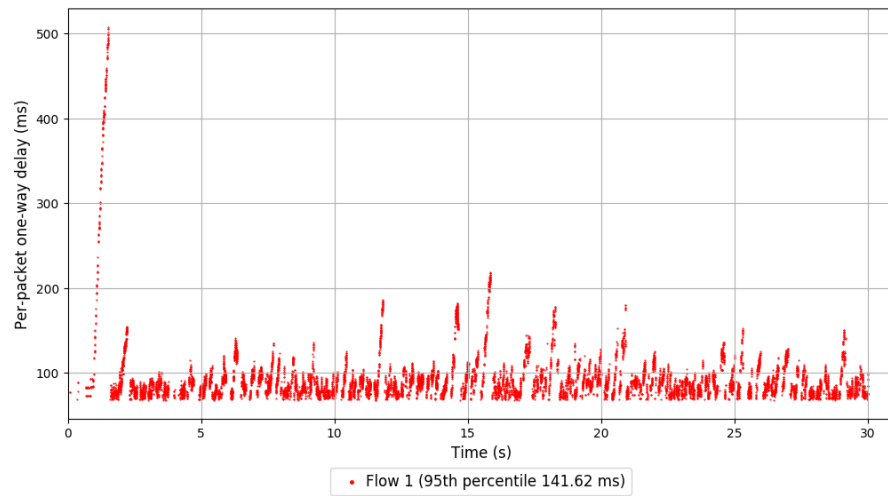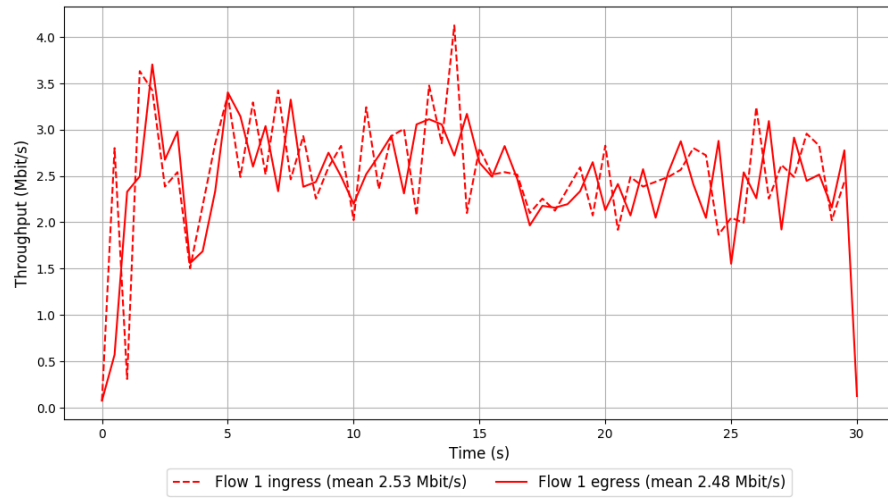
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 2.53 Mbit/s) --- Flow 1 egress (mean 2.48 Mbit/s)

Flow 1 (95th percentile 141.62 ms)

```
Run 1: Statistics of TCP Vegas

Start at: Tue, 11 Jul 2017 04:17:04 +0000
End at: Tue, 11 Jul 2017 04:17:34 +0000
Local clock offset: 0.103 ms
Remote clock offset: -0.029 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:49 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 92.682 ms
Loss rate: 13.18%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 92.682 ms
Loss rate: 13.18%
```
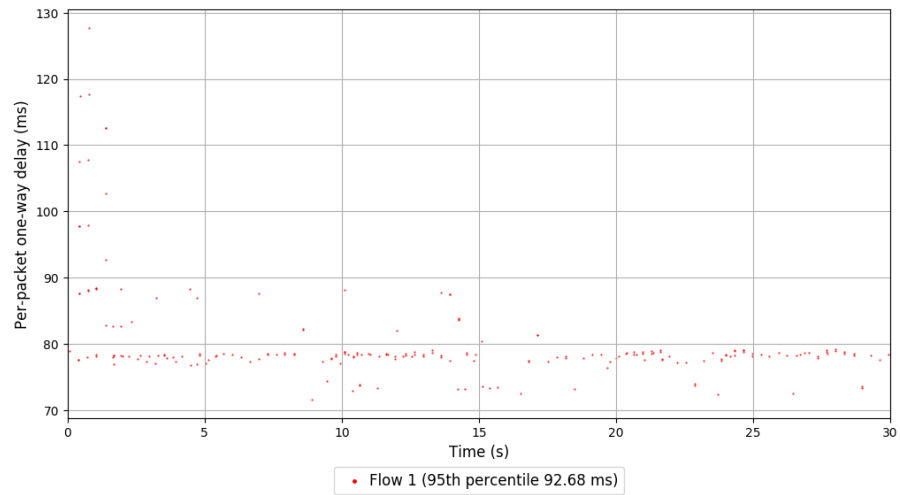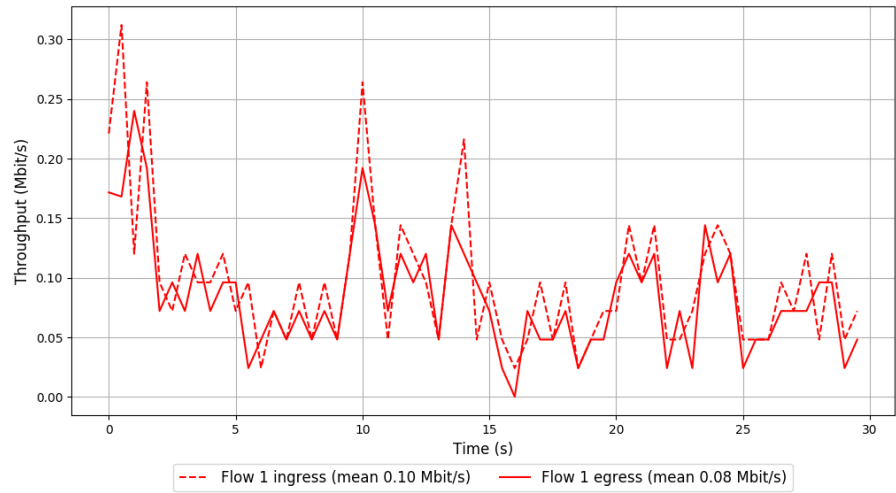
Run 1: Report of TCP Vegas — Data Link

```
Run 1: Statistics of Verus

Start at: Tue, 11 Jul 2017 04:11:08 +0000
End at: Tue, 11 Jul 2017 04:11:38 +0000
Local clock offset: 0.309 ms
Remote clock offset: -0.187 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:50 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.54 Mbit/s
95th percentile per-packet one-way delay: 570.012 ms
Loss rate: 7.45%
-- Flow 1:
Average throughput: 3.54 Mbit/s
95th percentile per-packet one-way delay: 570.012 ms
Loss rate: 7.45%
```
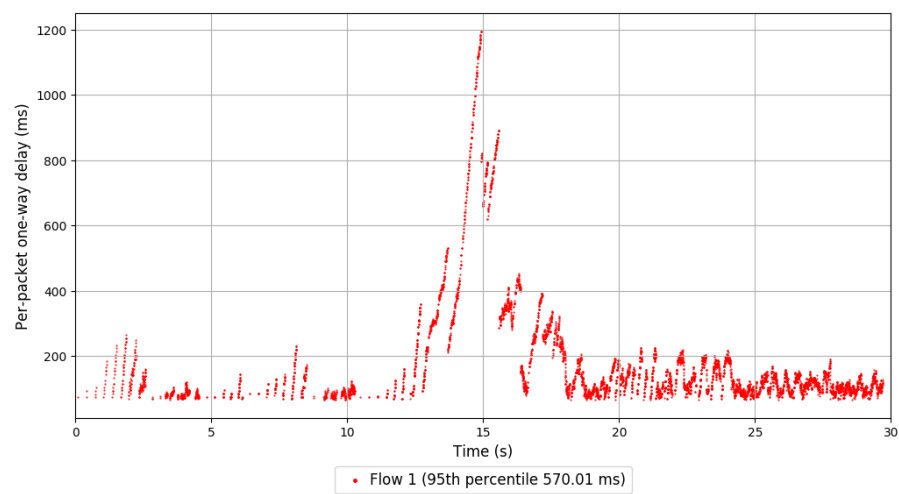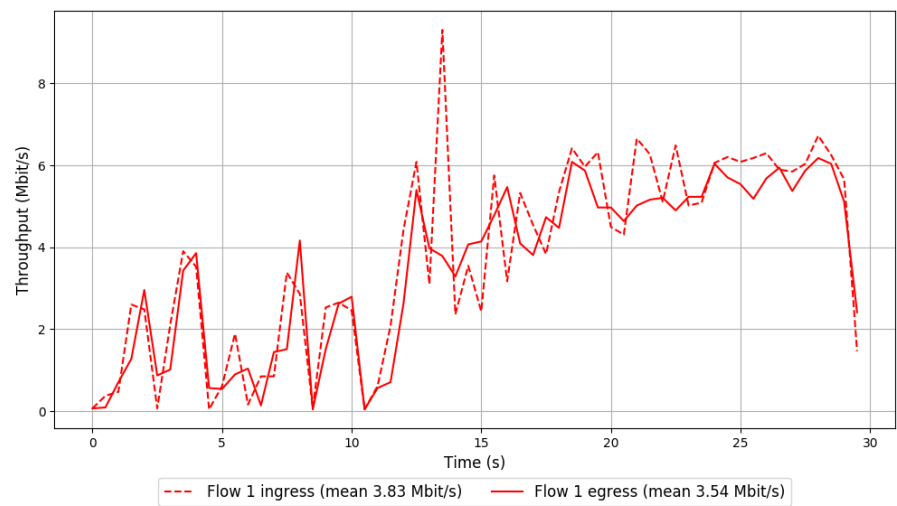
Run 1: Report of Verus — Data Link

```
Run 1: Statistics of WebRTC media

Start at: Tue, 11 Jul 2017 04:25:15 +0000
End at: Tue, 11 Jul 2017 04:25:45 +0000
Local clock offset: 0.269 ms
Remote clock offset: -0.269 ms


# Below is generated by plot.py at Tue, 11 Jul 2017 04:44:50 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 103.101 ms
Loss rate: 7.33%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 103.101 ms
Loss rate: 7.33%
```

Run 1: Report of WebRTC media — Data Link