

**Pantheon Summary** (Generated at Mon, 10 Jul 2017 22:22:42 +0000 with  
pantheon version c3610718e2bbac84102e8ac47b889a75d4392d79)

Repeated the test of 15 congestion control schemes once.

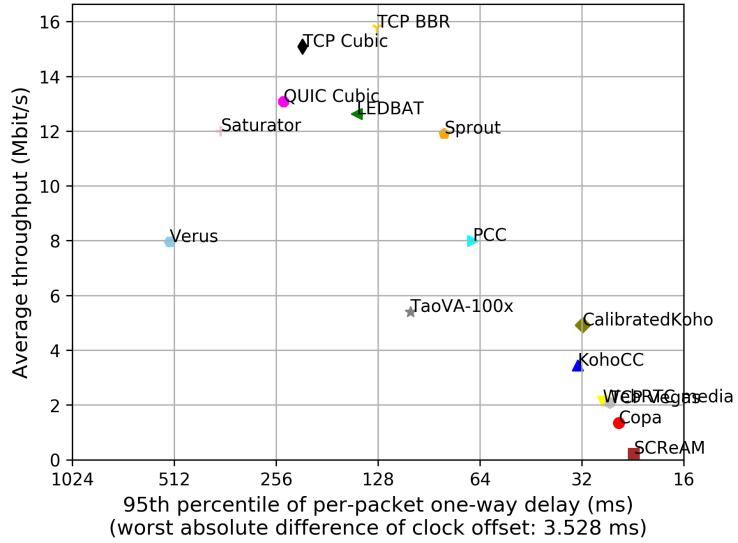
Each test lasted for 30 seconds running 1 flow.

Data path **from** AWS California 1 Ethernet **to** Stanford ppp0.

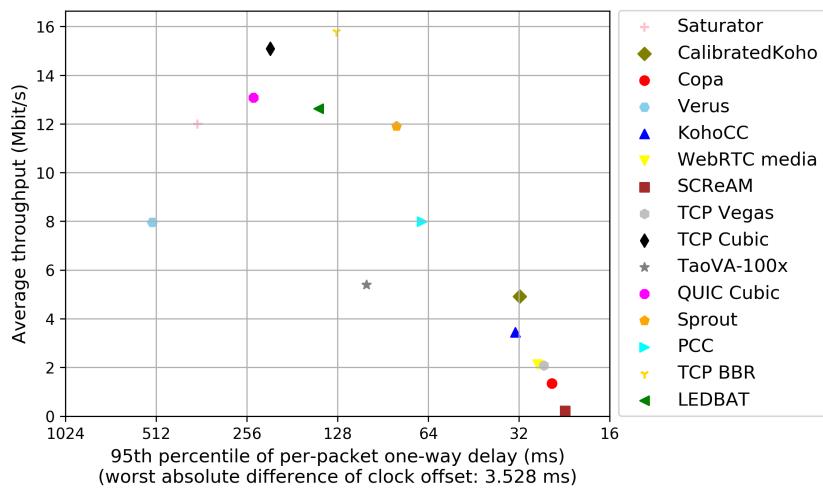
NTP offset measured against time.stanford.edu.

```
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 @ 6f2efef6e088d91066a9f023df375eee2665089ce
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 California 1 Ethernet to Stanford ppp0, 1 run of 30s each per scheme  
(mean of all runs by scheme)



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



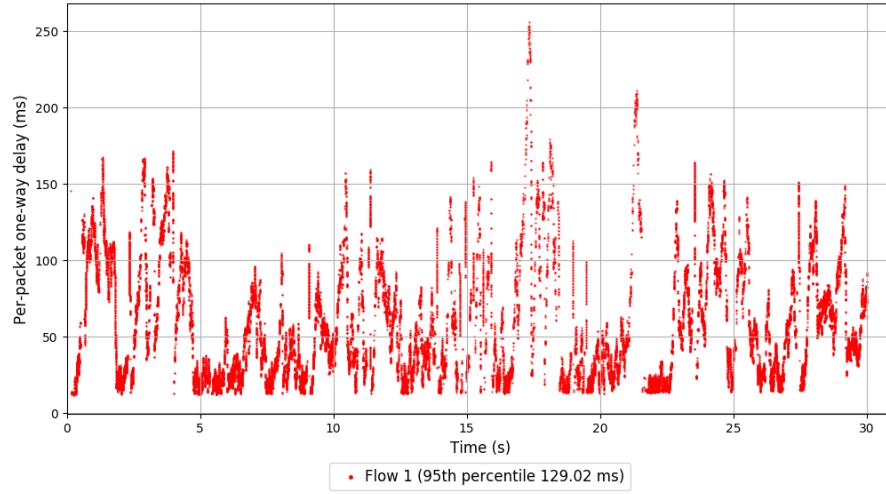
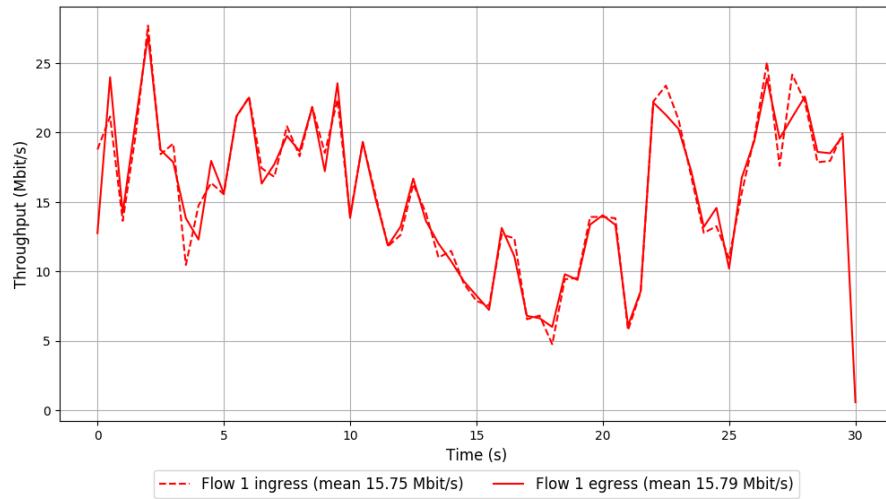
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	1	15.79	129.02	0.17
CalibratedKoho	1	4.92	31.84	0.00
Copa	1	1.34	24.91	0.00
TCP Cubic	1	15.10	214.29	0.19
KohoCC	1	3.45	32.97	0.00
LEDBAT	1	12.63	148.10	0.36
PCC	1	7.99	67.14	0.00
QUIC Cubic	1	13.08	243.47	0.47
Saturator	1	12.00	373.41	0.64
SCReAM	1	0.22	22.52	0.00
Sprout	1	11.92	81.68	0.05
TaoVA-100x	1	5.40	102.85	0.01
TCP Vegas	1	2.08	26.50	0.00
Verus	1	7.96	528.13	2.58
WebRTC media	1	2.12	27.73	0.00

Run 1: Statistics of TCP BBR

```
Start at: Mon, 10 Jul 2017 21:47:20 +0000
End at: Mon, 10 Jul 2017 21:47:50 +0000
Local clock offset: -0.243 ms
Remote clock offset: 0.0 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:27 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 15.79 Mbit/s
95th percentile per-packet one-way delay: 129.017 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 15.79 Mbit/s
95th percentile per-packet one-way delay: 129.017 ms
Loss rate: 0.17%
```

## Run 1: Report of TCP BBR — Data Link



```
Run 1: Statistics of CalibratedKoho
```

```
Start at: Mon, 10 Jul 2017 22:00:13 +0000
```

```
End at: Mon, 10 Jul 2017 22:00:43 +0000
```

```
Local clock offset: -0.372 ms
```

```
Remote clock offset: -2.569 ms
```

```
# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:27 +0000
```

```
# Datalink statistics
```

```
-- Total of 1 flow:
```

```
Average throughput: 4.92 Mbit/s
```

```
95th percentile per-packet one-way delay: 31.840 ms
```

```
Loss rate: 0.00%
```

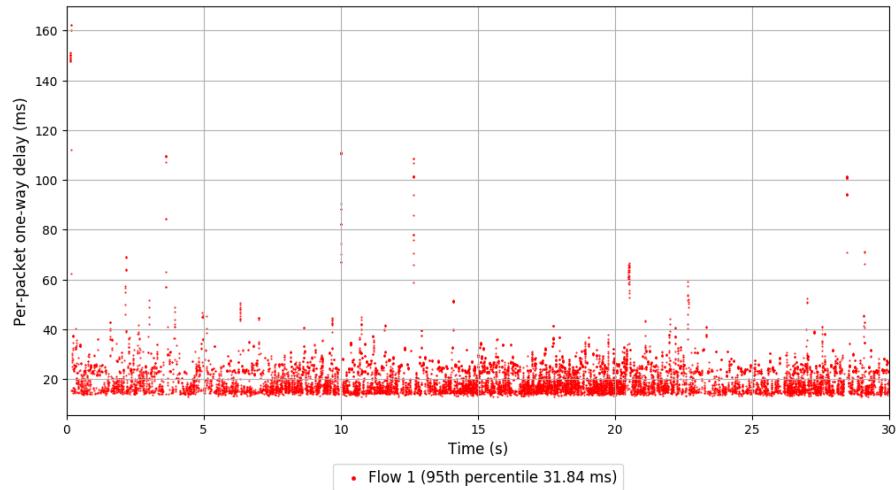
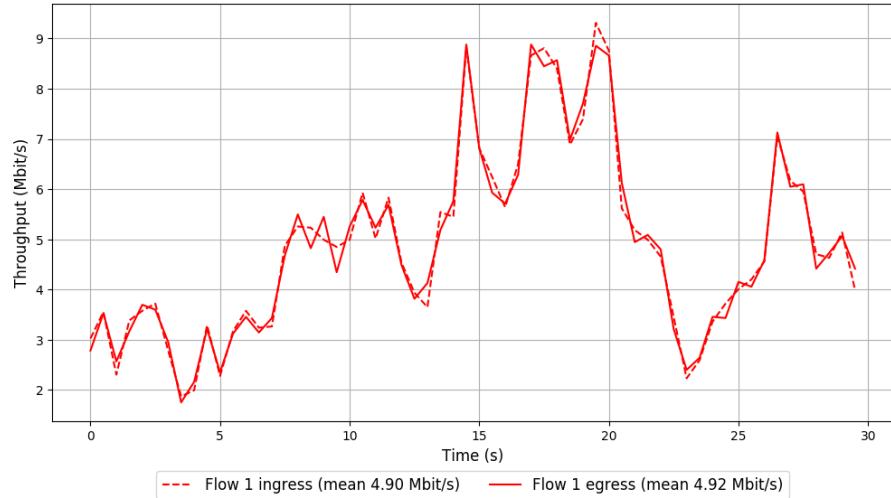
```
-- Flow 1:
```

```
Average throughput: 4.92 Mbit/s
```

```
95th percentile per-packet one-way delay: 31.840 ms
```

```
Loss rate: 0.00%
```

## Run 1: Report of CalibratedKoho — Data Link

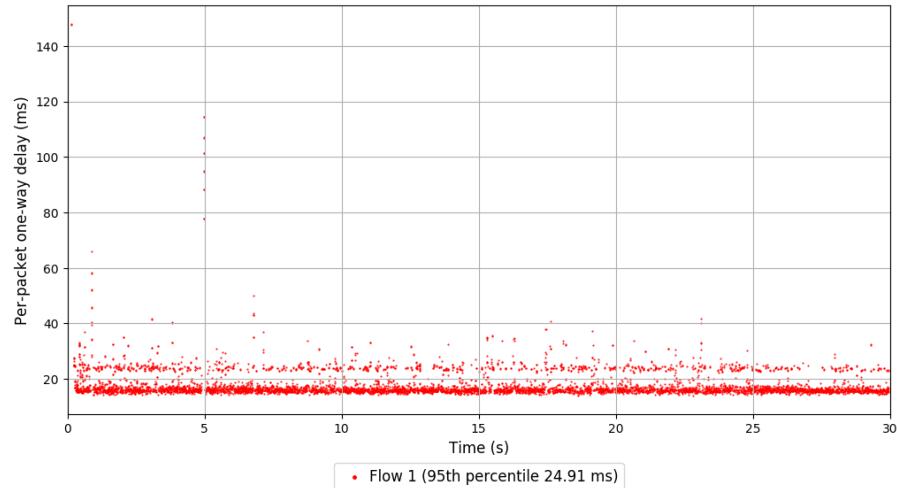
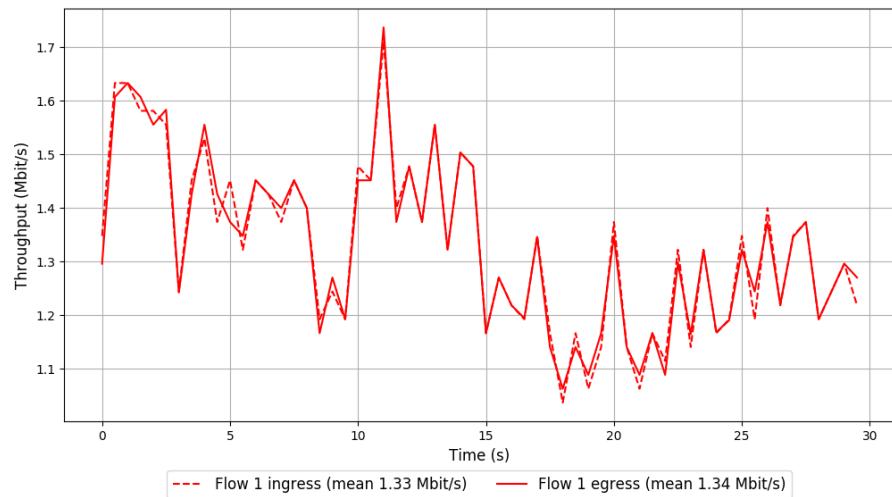


Run 1: Statistics of Copa

```
Start at: Mon, 10 Jul 2017 21:55:33 +0000
End at: Mon, 10 Jul 2017 21:56:03 +0000
Local clock offset: -0.242 ms
Remote clock offset: -3.77 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:27 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 24.910 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 24.910 ms
Loss rate: 0.00%
```

## Run 1: Report of Copa — Data Link



```
Run 1: Statistics of TCP Cubic
```

```
Start at: Mon, 10 Jul 2017 21:53:12 +0000
```

```
End at: Mon, 10 Jul 2017 21:53:42 +0000
```

```
Local clock offset: -0.31 ms
```

```
Remote clock offset: -3.661 ms
```

```
# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:29 +0000
```

```
# Datalink statistics
```

```
-- Total of 1 flow:
```

```
Average throughput: 15.10 Mbit/s
```

```
95th percentile per-packet one-way delay: 214.291 ms
```

```
Loss rate: 0.19%
```

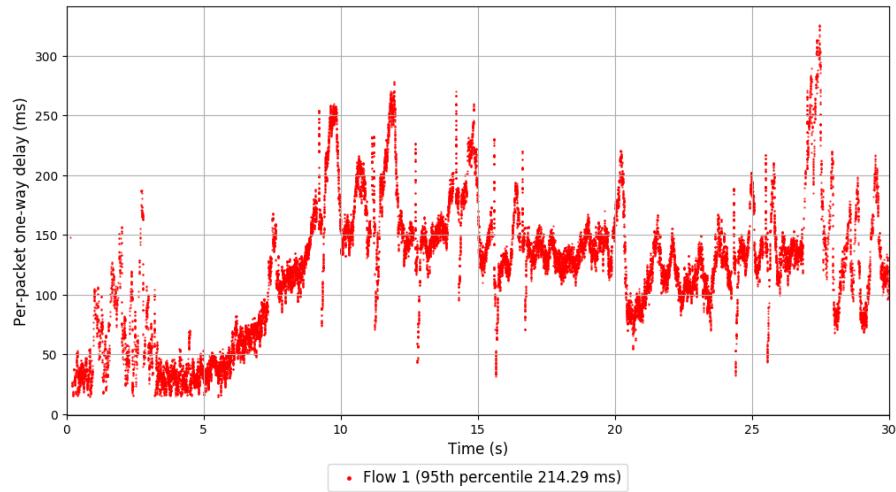
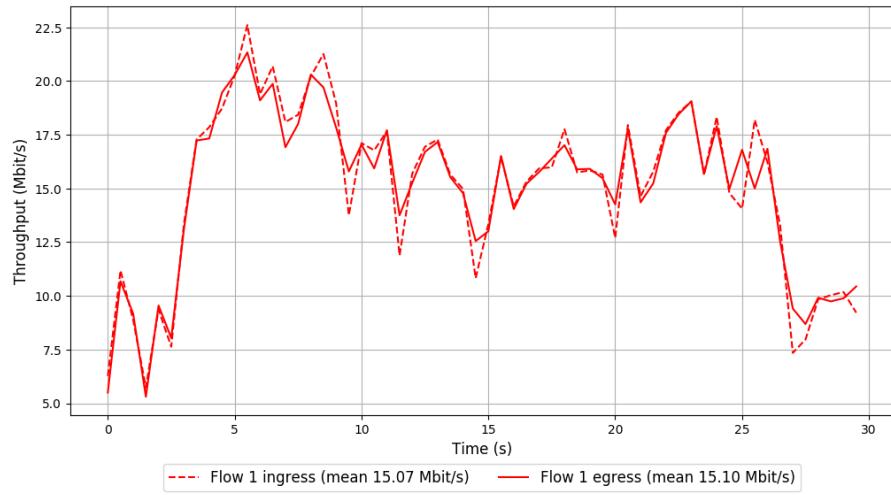
```
-- Flow 1:
```

```
Average throughput: 15.10 Mbit/s
```

```
95th percentile per-packet one-way delay: 214.291 ms
```

```
Loss rate: 0.19%
```

### Run 1: Report of TCP Cubic — Data Link



```
Run 1: Statistics of KohoCC
```

```
Start at: Mon, 10 Jul 2017 22:01:23 +0000
```

```
End at: Mon, 10 Jul 2017 22:01:53 +0000
```

```
Local clock offset: -0.297 ms
```

```
Remote clock offset: -2.401 ms
```

```
# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:29 +0000
```

```
# Datalink statistics
```

```
-- Total of 1 flow:
```

```
Average throughput: 3.45 Mbit/s
```

```
95th percentile per-packet one-way delay: 32.971 ms
```

```
Loss rate: 0.00%
```

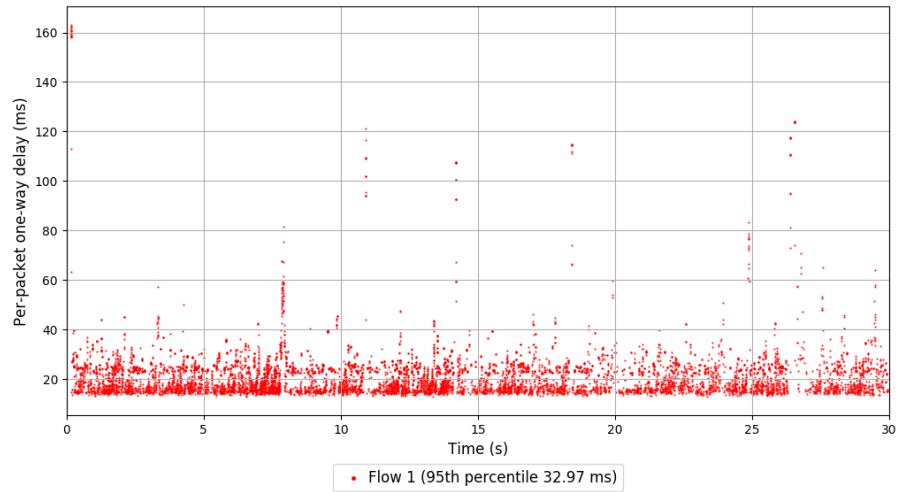
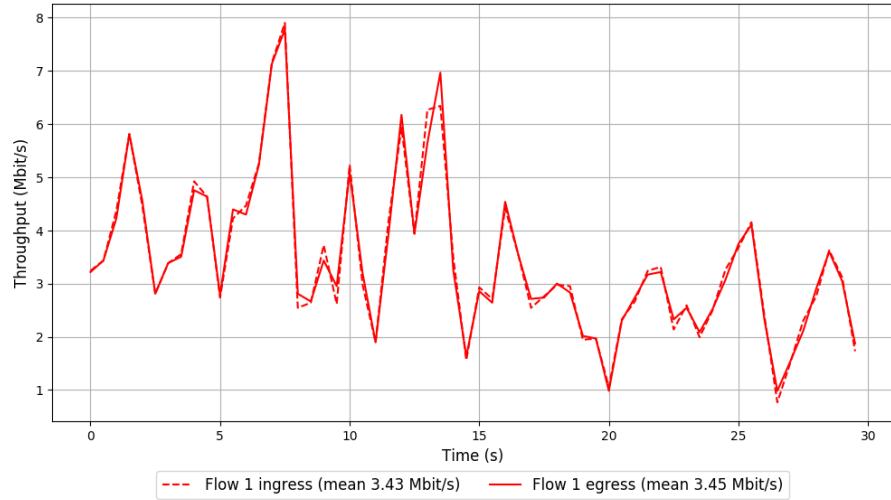
```
-- Flow 1:
```

```
Average throughput: 3.45 Mbit/s
```

```
95th percentile per-packet one-way delay: 32.971 ms
```

```
Loss rate: 0.00%
```

## Run 1: Report of KohoCC — Data Link

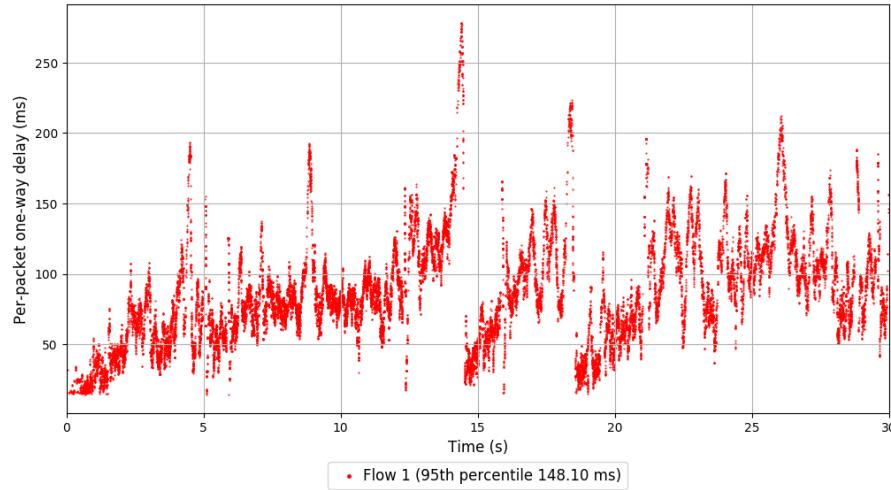
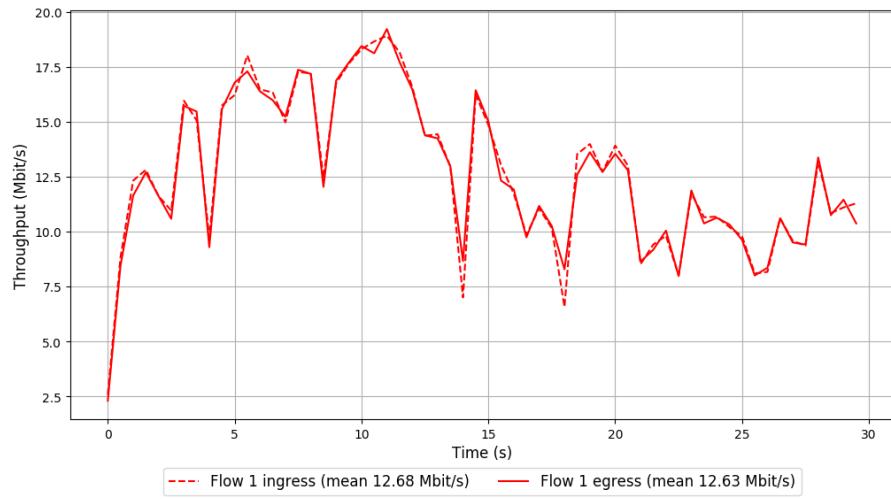


```
Run 1: Statistics of LEDBAT
```

```
Start at: Mon, 10 Jul 2017 21:50:52 +0000
End at: Mon, 10 Jul 2017 21:51:22 +0000
Local clock offset: -0.296 ms
Remote clock offset: -3.578 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:31 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.63 Mbit/s
95th percentile per-packet one-way delay: 148.104 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 12.63 Mbit/s
95th percentile per-packet one-way delay: 148.104 ms
Loss rate: 0.36%
```

## Run 1: Report of LEDBAT — Data Link

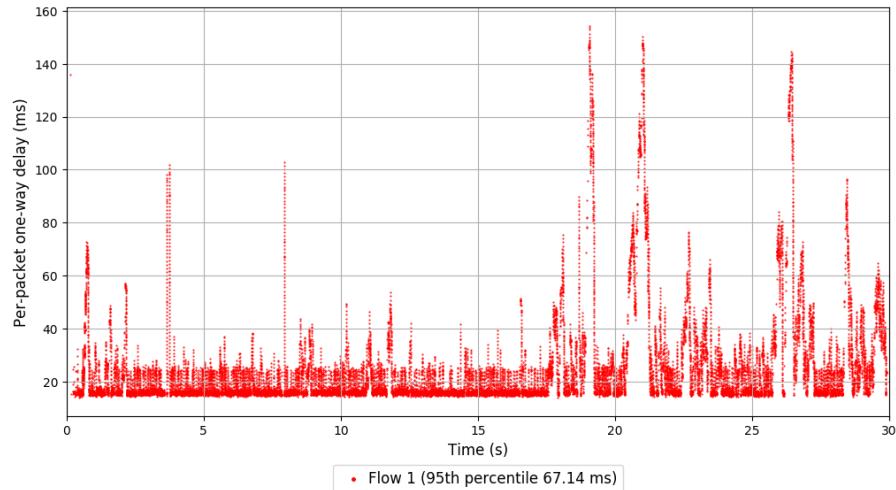
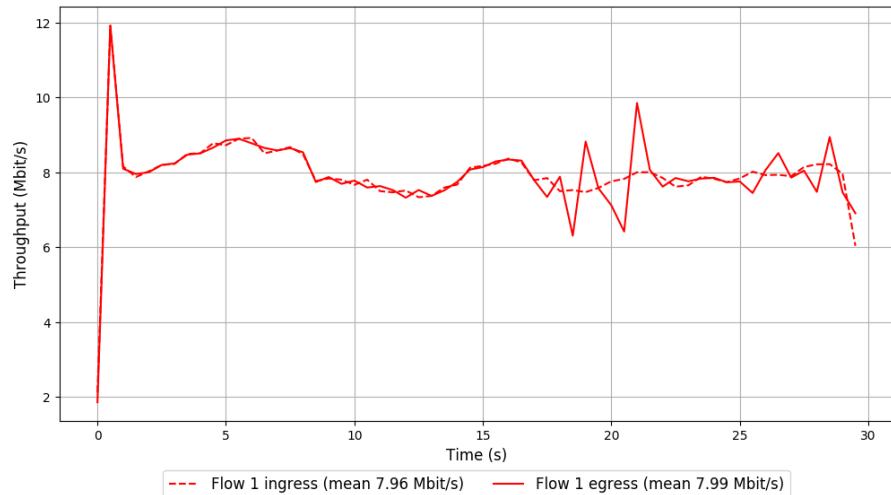


Run 1: Statistics of PCC

```
Start at: Mon, 10 Jul 2017 21:48:31 +0000
End at: Mon, 10 Jul 2017 21:49:01 +0000
Local clock offset: -0.276 ms
Remote clock offset: -3.388 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:31 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 67.137 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 67.137 ms
Loss rate: 0.00%
```

## Run 1: Report of PCC — Data Link

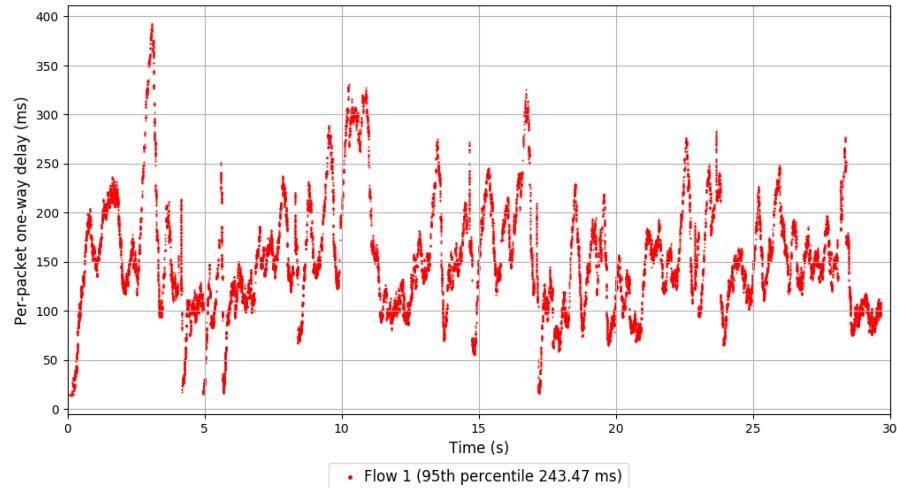
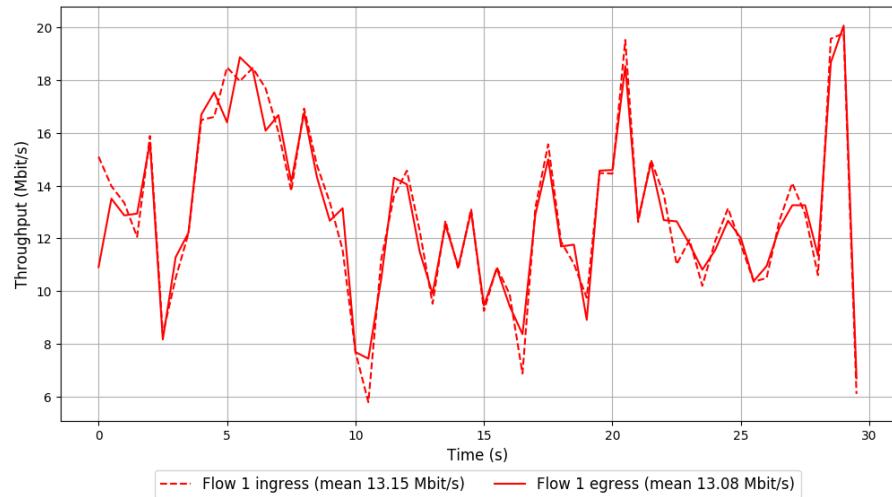


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: Mon, 10 Jul 2017 21:59:03 +0000
End at: Mon, 10 Jul 2017 21:59:33 +0000
Local clock offset: -0.257 ms
Remote clock offset: -2.851 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:34 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 13.08 Mbit/s
95th percentile per-packet one-way delay: 243.466 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 13.08 Mbit/s
95th percentile per-packet one-way delay: 243.466 ms
Loss rate: 0.47%
```

## Run 1: Report of QUIC Cubic — Data Link



```
Run 1: Statistics of Saturator
```

```
Start at: Mon, 10 Jul 2017 21:49:41 +0000
```

```
End at: Mon, 10 Jul 2017 21:50:11 +0000
```

```
Local clock offset: -0.262 ms
```

```
Remote clock offset: -3.565 ms
```

```
# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:34 +0000
```

```
# Datalink statistics
```

```
-- Total of 1 flow:
```

```
Average throughput: 12.00 Mbit/s
```

```
95th percentile per-packet one-way delay: 373.409 ms
```

```
Loss rate: 0.64%
```

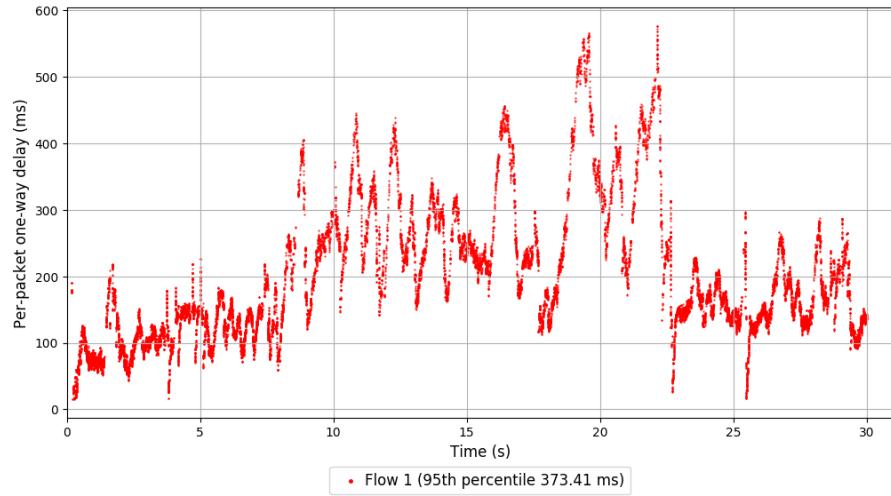
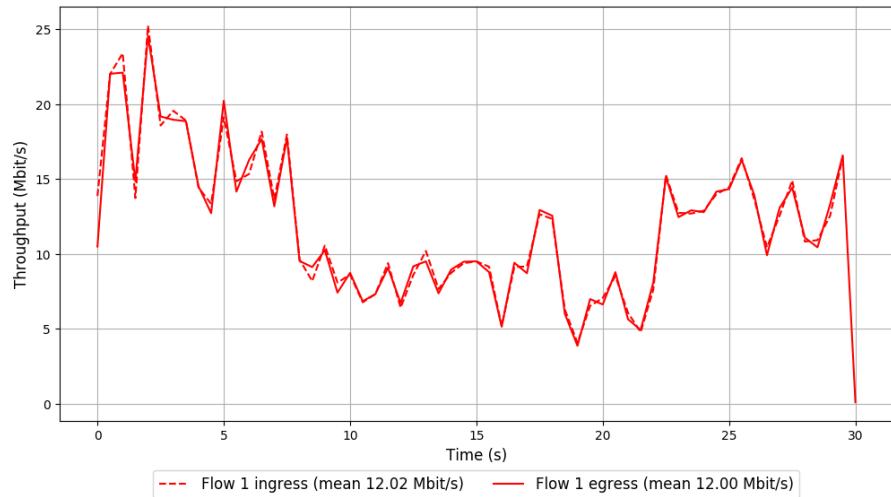
```
-- Flow 1:
```

```
Average throughput: 12.00 Mbit/s
```

```
95th percentile per-packet one-way delay: 373.409 ms
```

```
Loss rate: 0.64%
```

### Run 1: Report of Saturator — Data Link

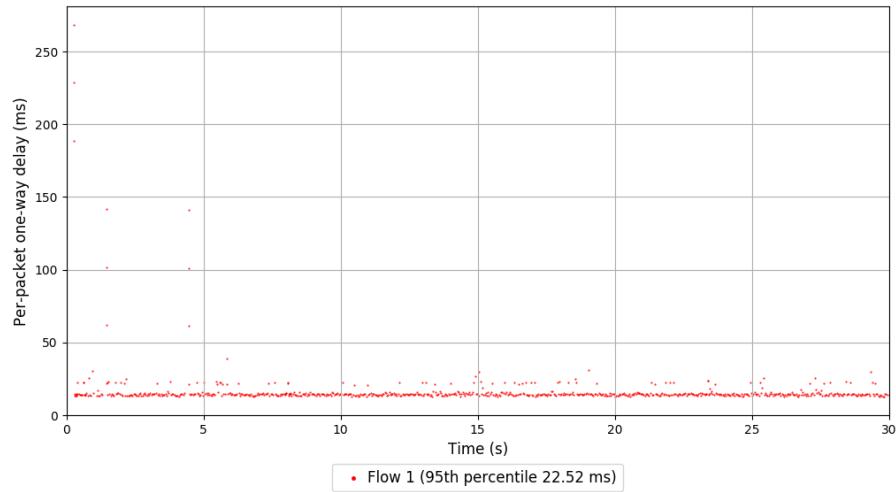
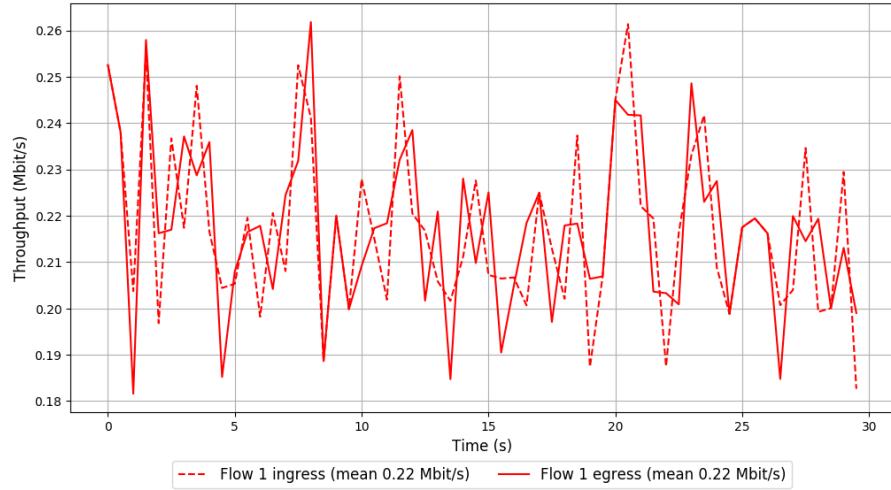


Run 1: Statistics of SCReAM

```
Start at: Mon, 10 Jul 2017 22:03:43 +0000
End at: Mon, 10 Jul 2017 22:04:13 +0000
Local clock offset: -0.406 ms
Remote clock offset: -2.101 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:35 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 22.515 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 22.515 ms
Loss rate: 0.00%
```

## Run 1: Report of SCReAM — Data Link

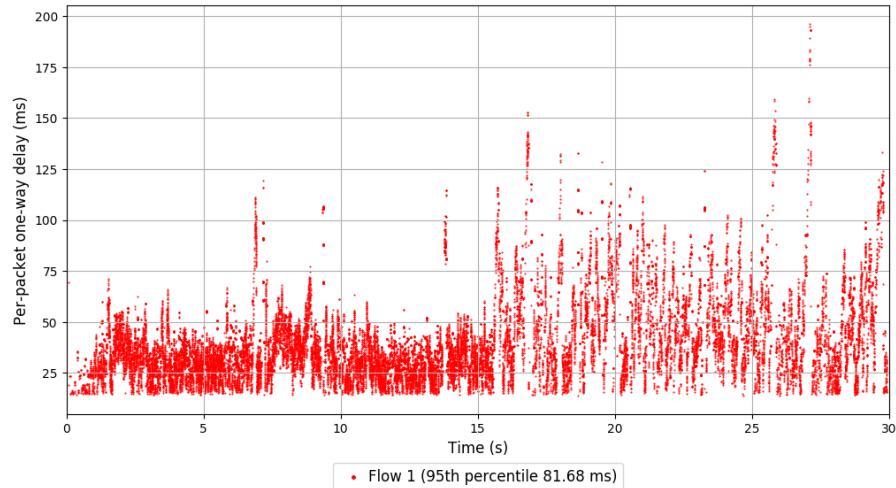
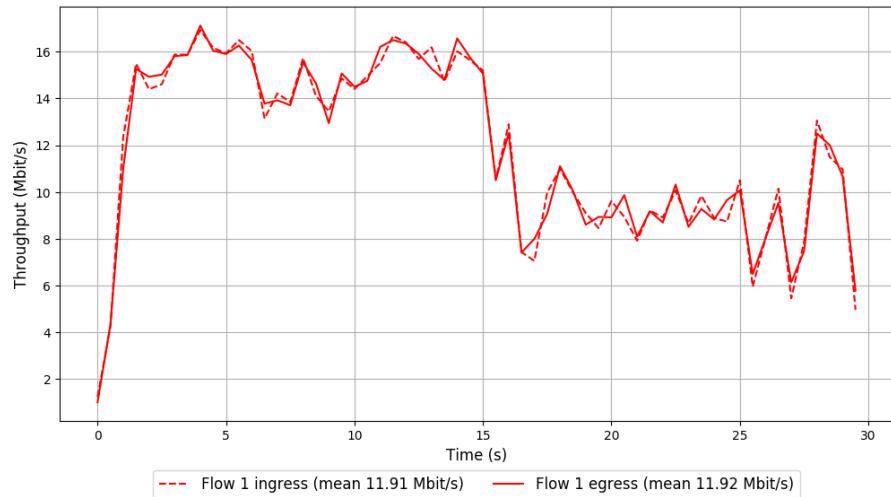


Run 1: Statistics of Sprout

```
Start at: Mon, 10 Jul 2017 21:57:53 +0000
End at: Mon, 10 Jul 2017 21:58:23 +0000
Local clock offset: -0.35 ms
Remote clock offset: -3.234 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:37 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.92 Mbit/s
95th percentile per-packet one-way delay: 81.683 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 11.92 Mbit/s
95th percentile per-packet one-way delay: 81.683 ms
Loss rate: 0.05%
```

## Run 1: Report of Sprout — Data Link

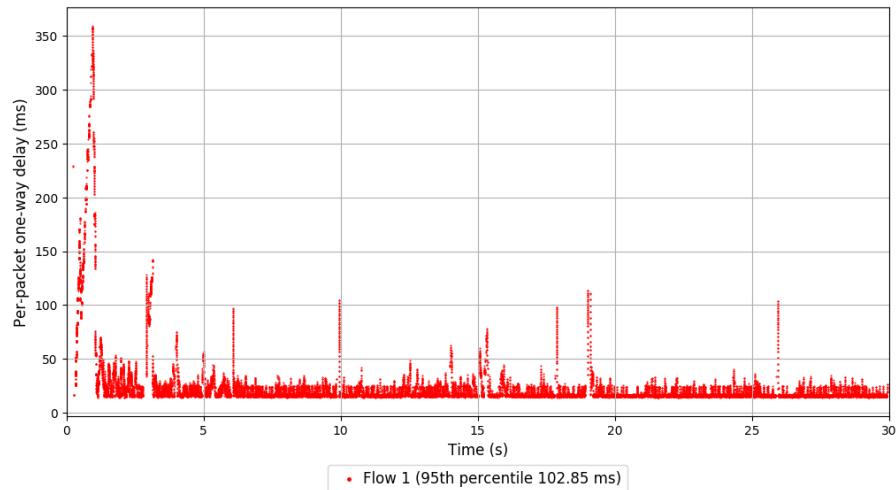
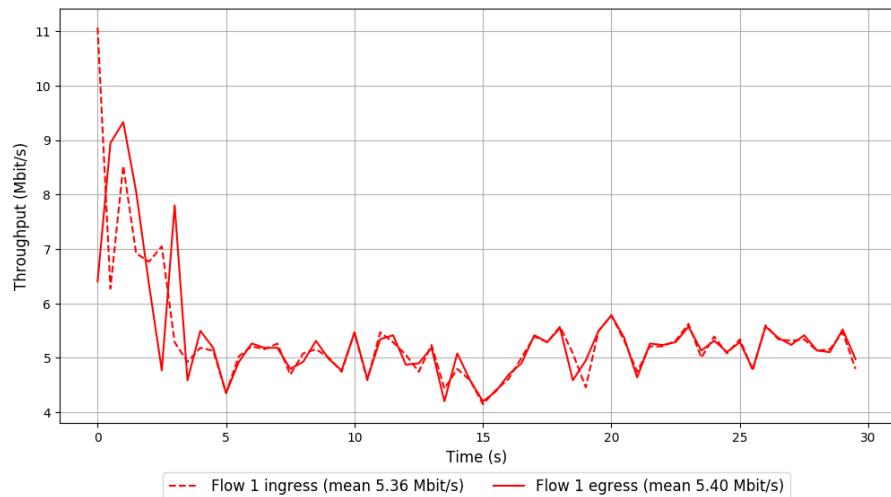


Run 1: Statistics of TaoVA-100x

```
Start at: Mon, 10 Jul 2017 21:54:22 +0000
End at: Mon, 10 Jul 2017 21:54:52 +0000
Local clock offset: -0.301 ms
Remote clock offset: -3.577 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:37 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 102.847 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 5.40 Mbit/s
95th percentile per-packet one-way delay: 102.847 ms
Loss rate: 0.01%
```

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

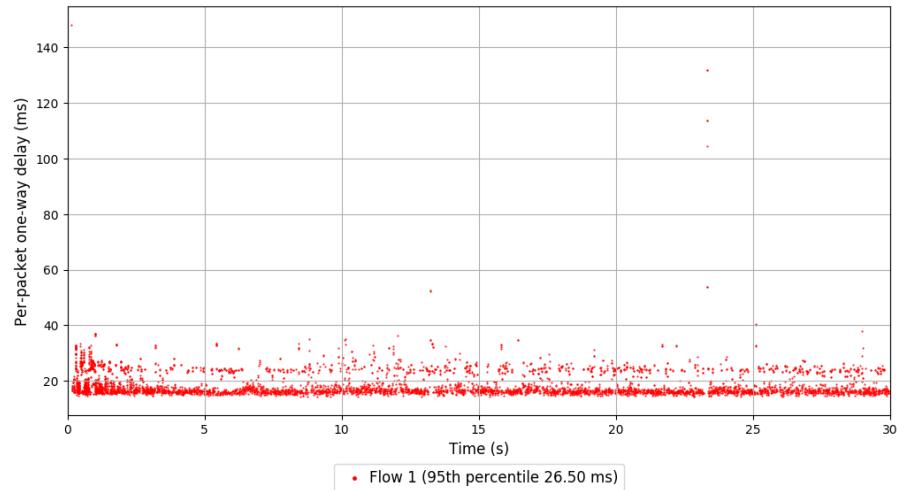
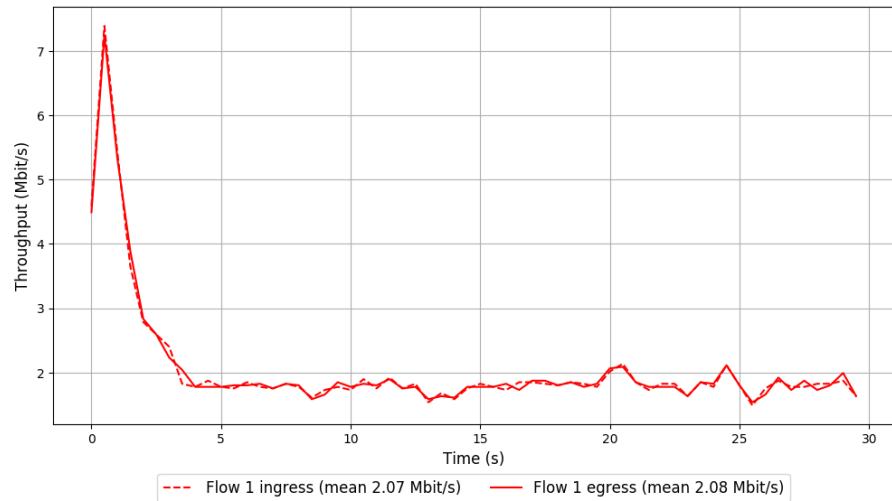


Run 1: Statistics of TCP Vegas

```
Start at: Mon, 10 Jul 2017 21:52:02 +0000
End at: Mon, 10 Jul 2017 21:52:32 +0000
Local clock offset: -0.212 ms
Remote clock offset: -3.599 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:38 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 26.498 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 26.498 ms
Loss rate: 0.00%
```

## Run 1: Report of TCP Vegas — Data Link

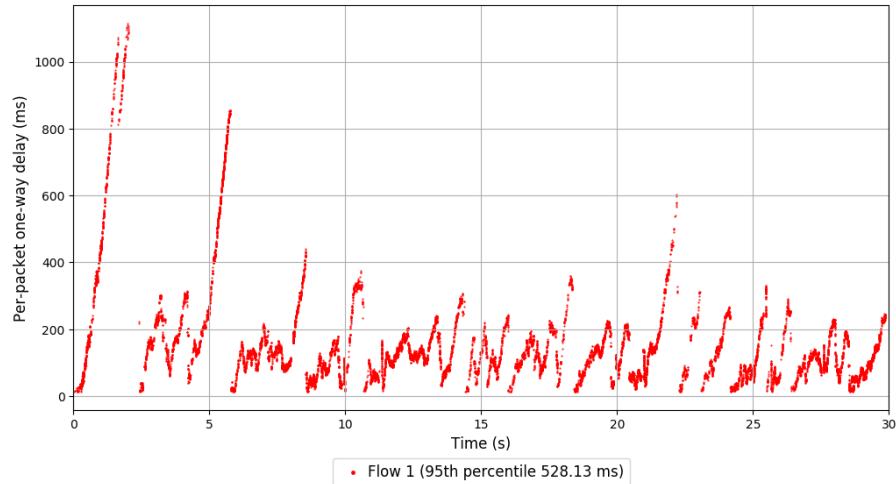
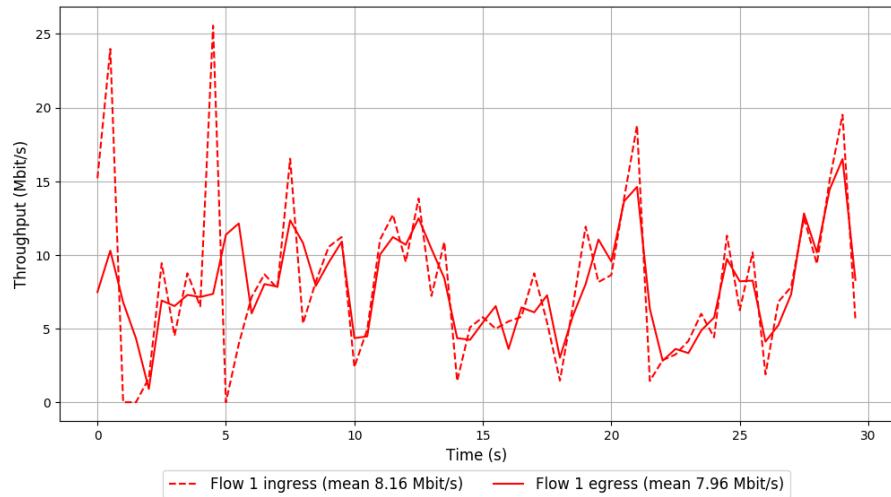


Run 1: Statistics of Verus

```
Start at: Mon, 10 Jul 2017 22:02:33 +0000
End at: Mon, 10 Jul 2017 22:03:03 +0000
Local clock offset: -0.313 ms
Remote clock offset: -2.204 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:40 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.96 Mbit/s
95th percentile per-packet one-way delay: 528.133 ms
Loss rate: 2.58%
-- Flow 1:
Average throughput: 7.96 Mbit/s
95th percentile per-packet one-way delay: 528.133 ms
Loss rate: 2.58%
```

## Run 1: Report of Verus — Data Link



```
Run 1: Statistics of WebRTC media

Start at: Mon, 10 Jul 2017 21:56:43 +0000
End at: Mon, 10 Jul 2017 21:57:13 +0000
Local clock offset: -0.349 ms
Remote clock offset: -3.529 ms

# Below is generated by plot.py at Mon, 10 Jul 2017 22:22:40 +0000
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 27.735 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 27.735 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

