Pantheon Report

Generated at 2017-08-10 19:21:12 (UTC).

Data path: Colombia ppp0 (*remote*) →AWS Brazil 2 Ethernet (*local*).

Repeated the test of 15 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

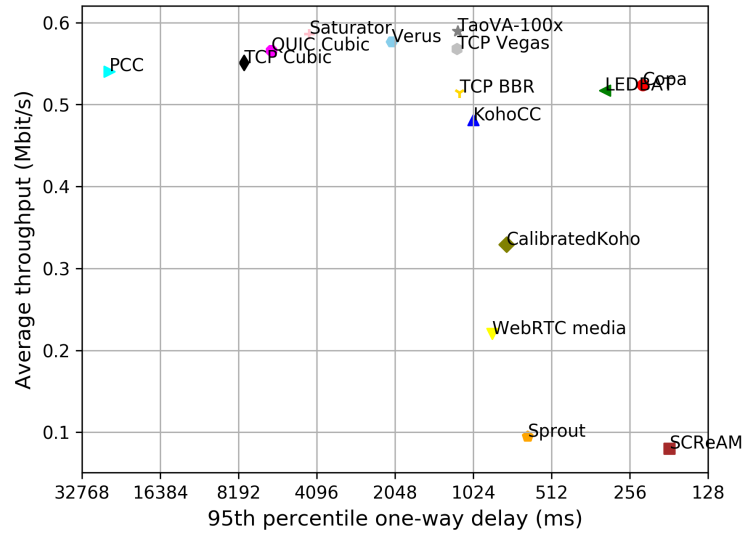Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

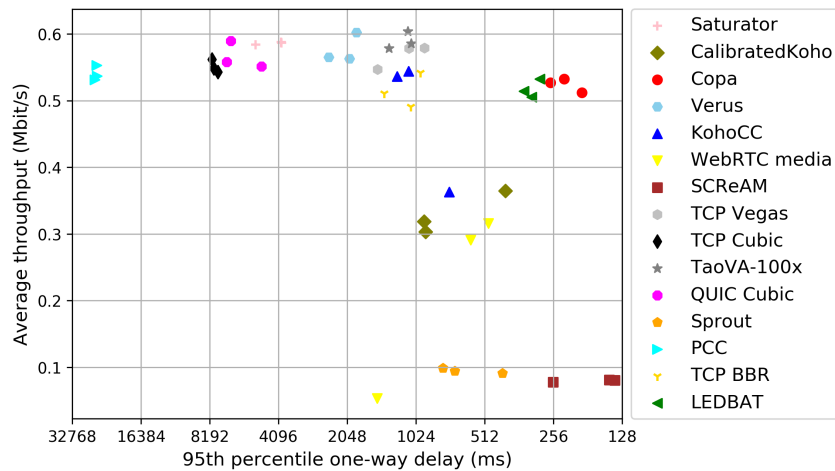NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

```
Git summary:
branch: master @ e43be7582298d552838afcf6382342bf187fbbd6
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 @ baf443516dea3eeddeccaf9b916cc313273ca4f4
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 Colombia ppp0 to AWS Brazil 2 Ethernet, 3 runs of 30s each per scheme (mean of all runs by scheme)

test from Colombia ppp0 to AWS Brazil 2 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	0.51	1158.35	2.46
CalibratedKoho	3	0.33	763.66	0.97
Copa	3	0.52	228.69	0.86
TCP Cubic	3	0.55	7813.14	31.31
KohoCC	3	0.48	1026.01	1.60
LEDBAT	3	0.52	319.42	0.82
PCC	3	0.54	25779.83	98.55
QUIC Cubic	3	0.57	6142.29	25.42
Saturator	3	0.59	4380.60	13.01
SCReAM	3	0.08	180.44	0.58
Sprout	3	0.09	633.85	1.34
TaoVA-100x	3	0.59	1178.69	2.67
TCP Vegas	3	0.57	1184.19	1.79
Verus	3	0.58	2115.00	6.37
WebRTC media	3	0.22	867.38	0.54

```
Run 1: Statistics of TCP BBR

Start at: 2017-08-10 17:46:51
End at: 2017-08-10 17:47:21
Local clock offset: 0.416 ms
Remote clock offset: 1.598 ms

# Below is generated by plot.py at 2017-08-10 19:20:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 1413.157 ms
Loss rate: 2.33%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 1413.157 ms
Loss rate: 2.33%
```
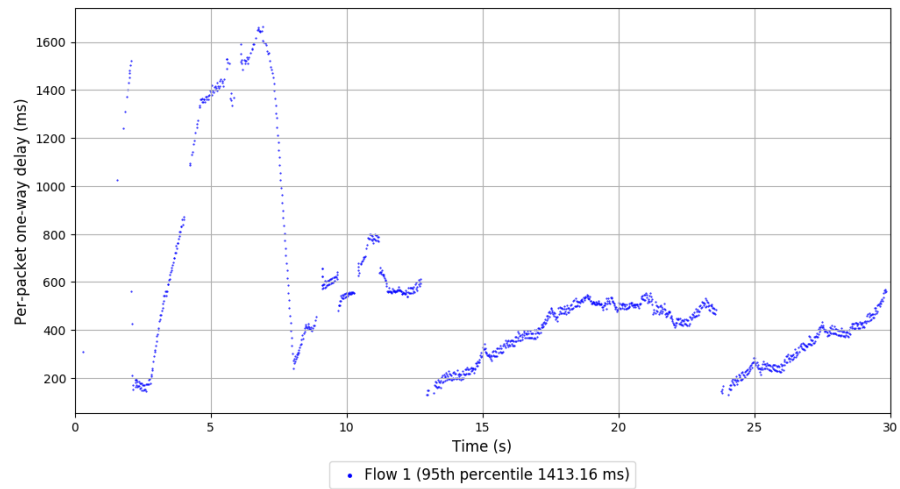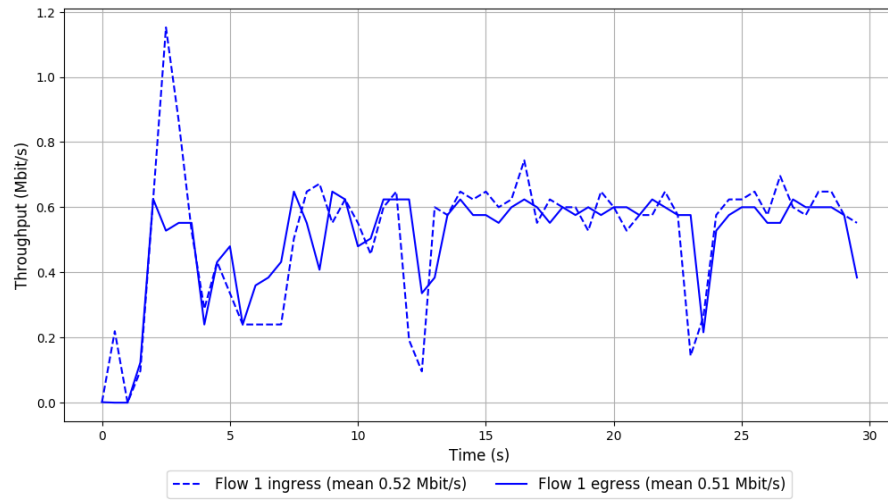
Run 1: Report of TCP BBR — Data Link

```
Run 2: Statistics of TCP BBR

Start at: 2017-08-10 18:04:28
End at: 2017-08-10 18:04:58
Local clock offset: 0.67 ms
Remote clock offset: 2.068 ms


# Below is generated by plot.py at 2017-08-10 19:20:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1079.896 ms
Loss rate: 2.70%
-- Flow 1:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1079.896 ms
Loss rate: 2.70%
```
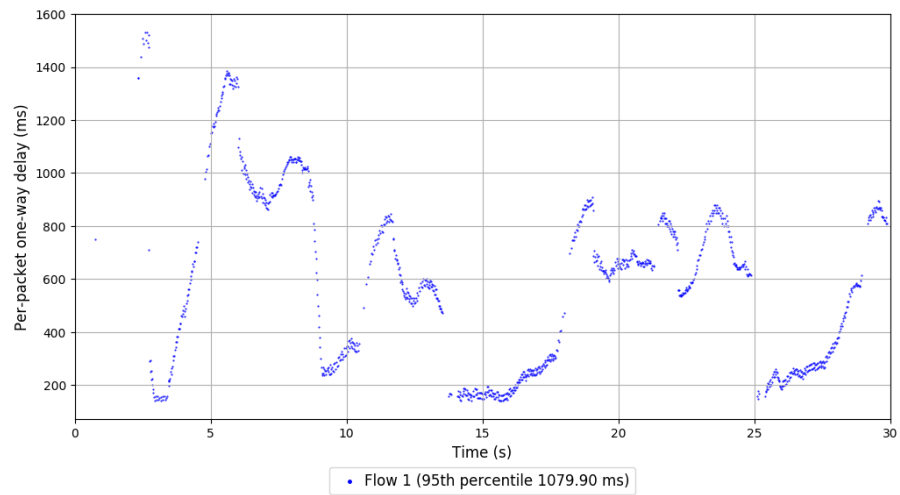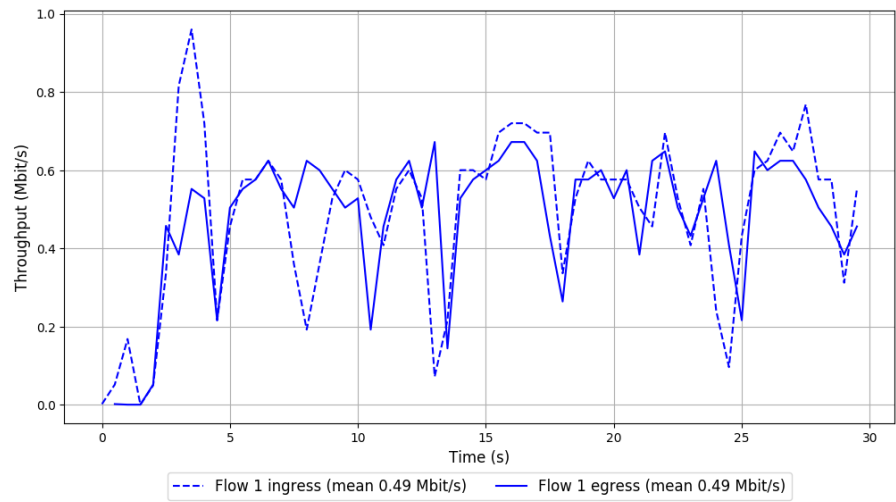
Run 2: Report of TCP BBR — Data Link

```
Run 3: Statistics of TCP BBR

Start at: 2017-08-10 18:22:05
End at: 2017-08-10 18:22:35
Local clock offset: 0.833 ms
Remote clock offset: -1.911 ms


# Below is generated by plot.py at 2017-08-10 19:20:45
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 981.985 ms
Loss rate: 2.34%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 981.985 ms
Loss rate: 2.34%
```
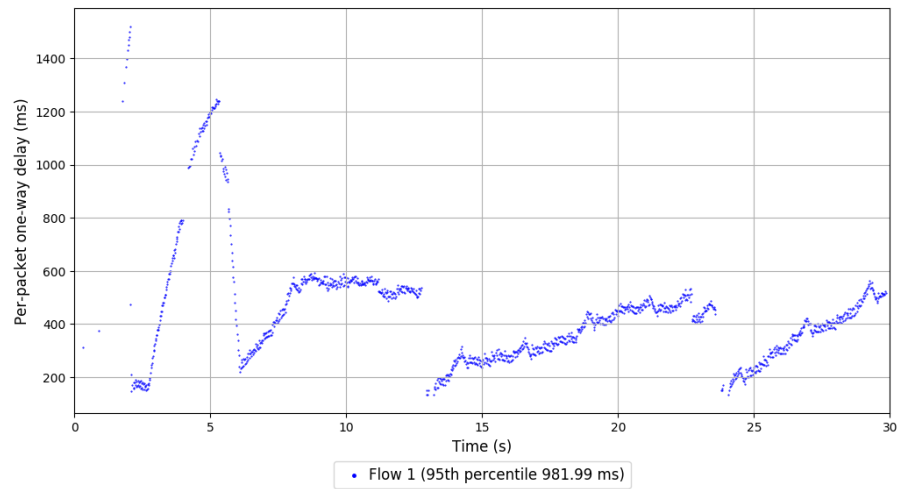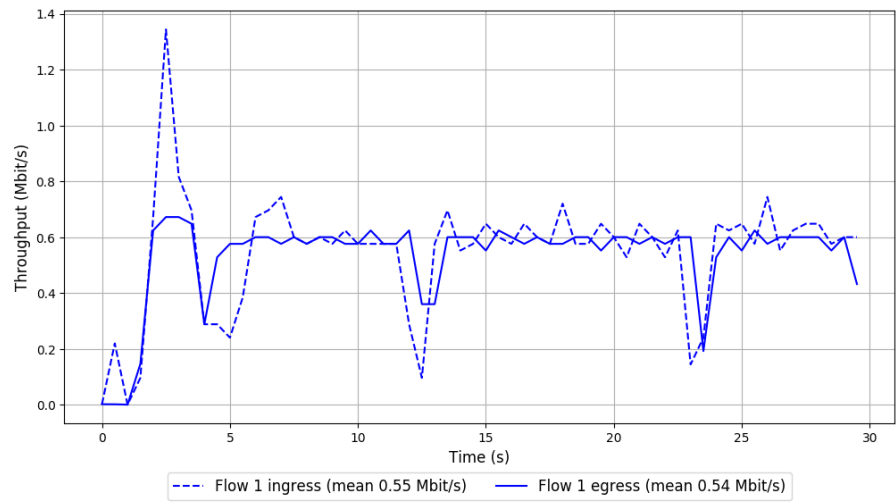
Run 3: Report of TCP BBR — Data Link

Flow 1 ingress (mean 0.55 Mbit/s) --- Flow 1 egress (mean 0.54 Mbit/s)

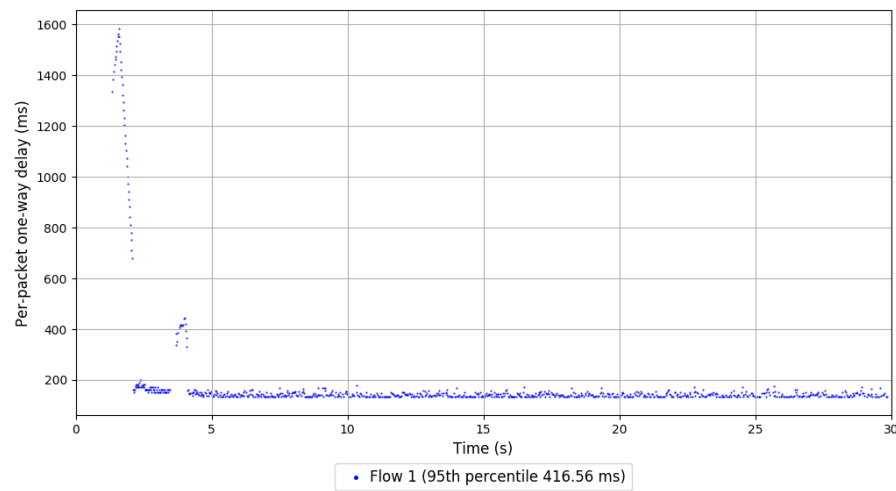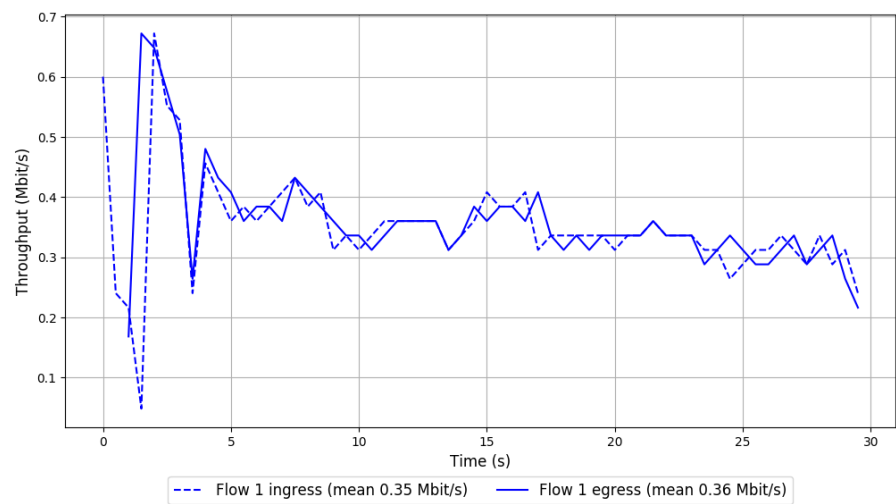Flow 1 (95th percentile 981.99 ms)

```
Run 1: Statistics of CalibratedKoho

Start at: 2017-08-10 17:35:08
End at: 2017-08-10 17:35:38
Local clock offset: 0.252 ms
Remote clock offset: -3.558 ms


# Below is generated by plot.py at 2017-08-10 19:20:45
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 416.559 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 416.559 ms
Loss rate: 1.03%
```

Run 1: Report of CalibratedKoho — Data Link

```
Run 2: Statistics of CalibratedKoho

Start at: 2017-08-10 17:52:43
End at: 2017-08-10 17:53:13
Local clock offset: 0.425 ms
Remote clock offset: 1.711 ms


# Below is generated by plot.py at 2017-08-10 19:20:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 928.995 ms
Loss rate: 0.69%
-- Flow 1:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 928.995 ms
Loss rate: 0.69%
```
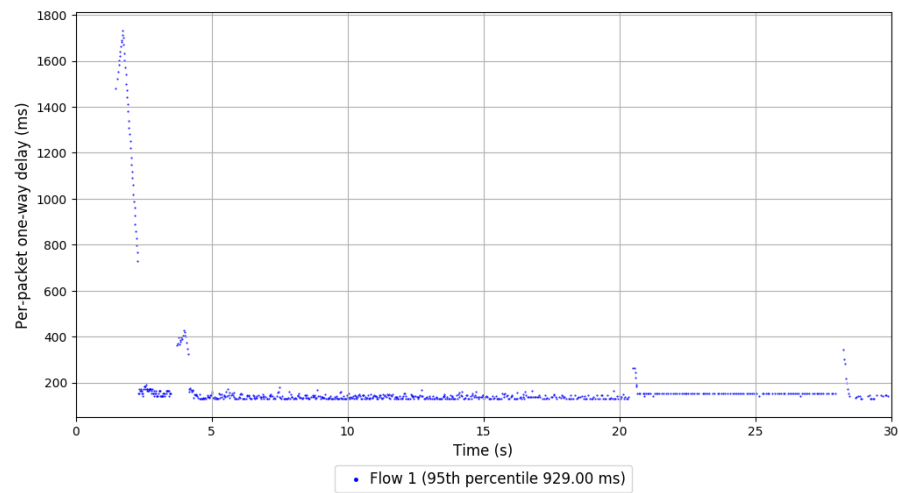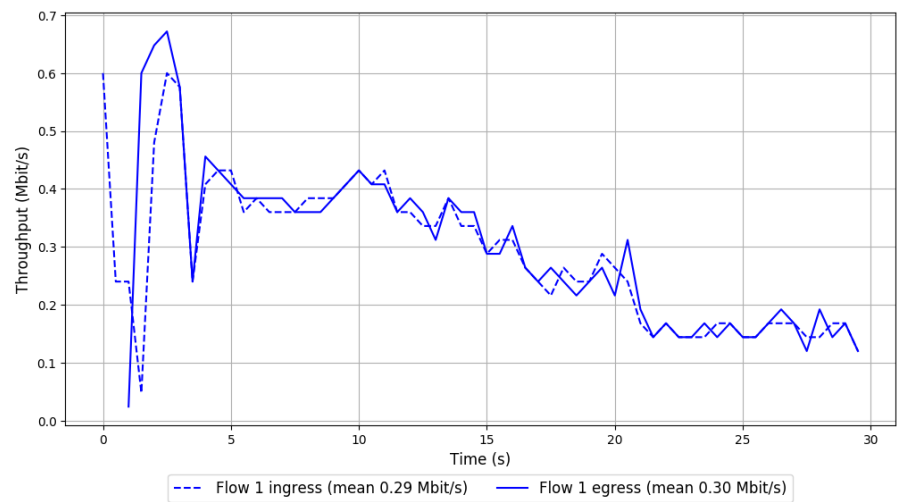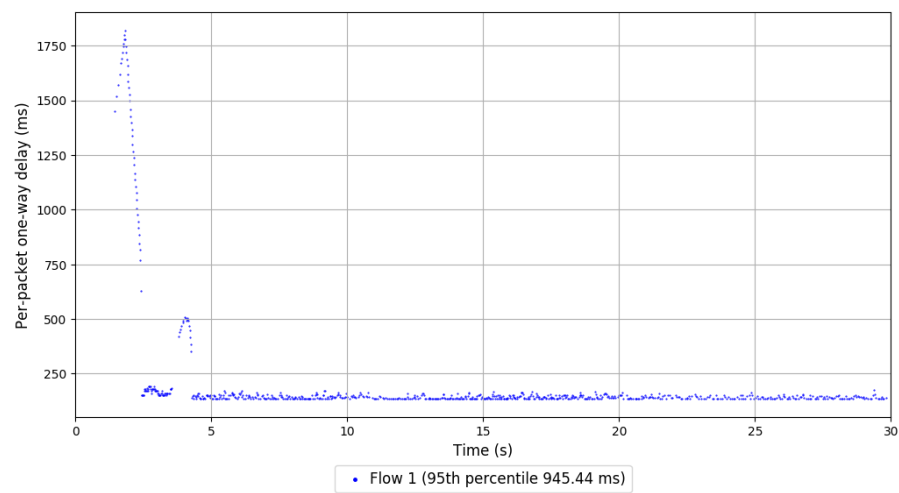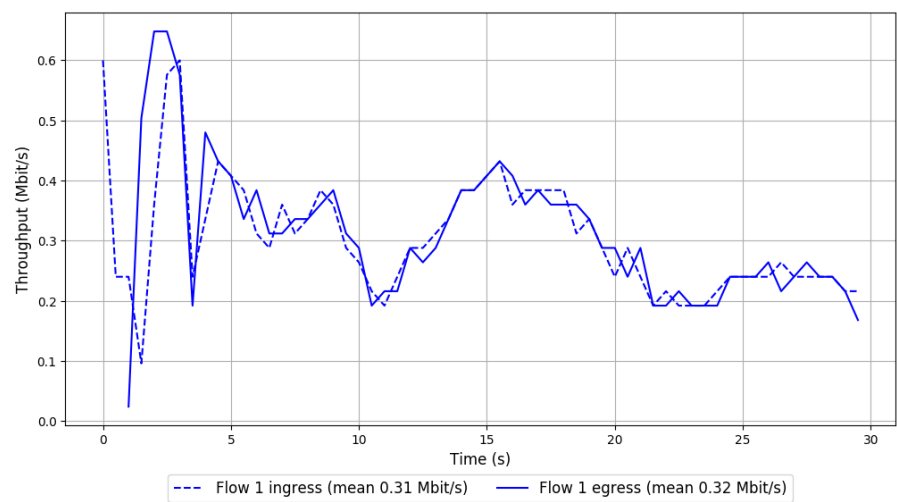
Run 2: Report of CalibratedKoho — Data Link

```
Run 3: Statistics of CalibratedKoho

Start at: 2017-08-10 18:10:19
End at: 2017-08-10 18:10:50
Local clock offset: 0.743 ms
Remote clock offset: -2.986 ms


# Below is generated by plot.py at 2017-08-10 19:20:46
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 945.437 ms
Loss rate: 1.18%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 945.437 ms
Loss rate: 1.18%
```

Run 3: Report of CalibratedKoho — Data Link

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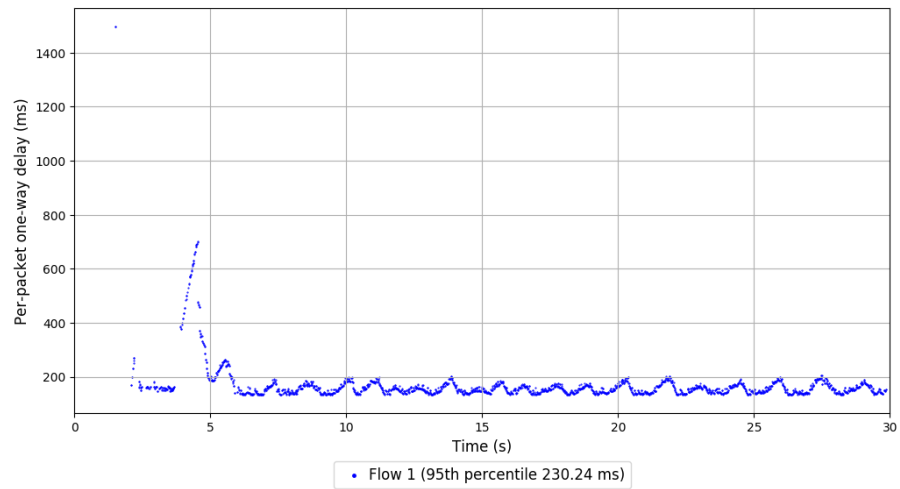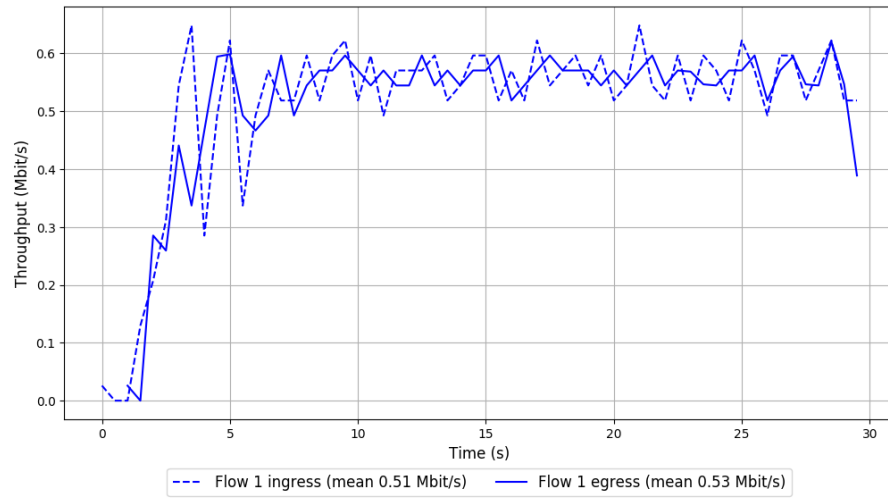

Flow 1 (95th percentile 945.44 ms)

```
Run 1: Statistics of Copa

Start at: 2017-08-10 17:43:20
End at: 2017-08-10 17:43:50
Local clock offset: 0.328 ms
Remote clock offset: -3.066 ms


# Below is generated by plot.py at 2017-08-10 19:20:47
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 230.244 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 230.244 ms
Loss rate: 0.94%
```

Run 1: Report of Copa — Data Link

Flow 1 ingress (mean 0.51 Mbit/s) --- Flow 1 egress (mean 0.53 Mbit/s)

Flow 1 (95th percentile 230.24 ms)

```
Run 2: Statistics of Copa

Start at: 2017-08-10 18:00:57
End at: 2017-08-10 18:01:27
Local clock offset: 0.554 ms
Remote clock offset: 2.096 ms


# Below is generated by plot.py at 2017-08-10 19:20:47
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 192.152 ms
Loss rate: 0.78%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 192.152 ms
Loss rate: 0.78%
```
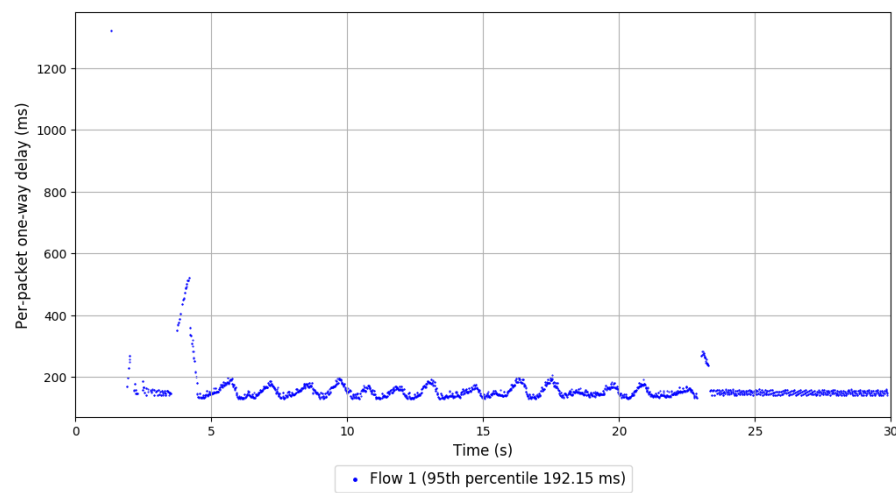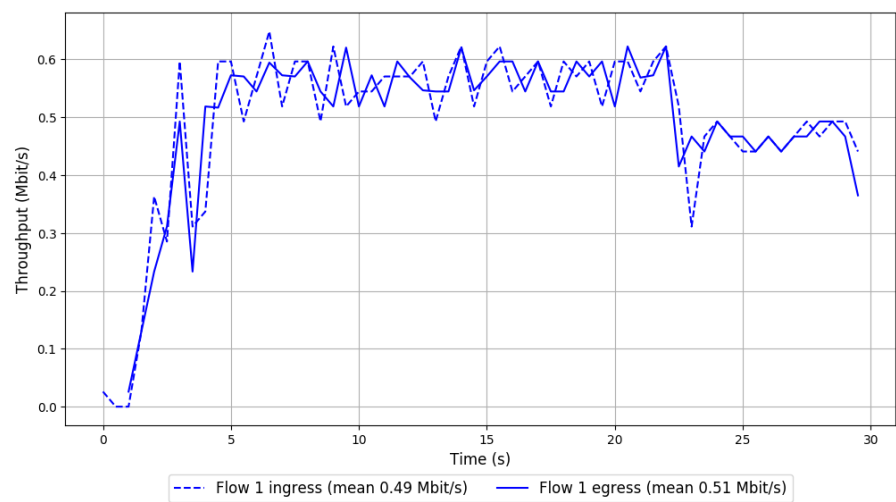
Run 2: Report of Copa — Data Link

Flow 1 ingress (mean 0.49 Mbit/s)   Flow 1 egress (mean 0.51 Mbit/s)

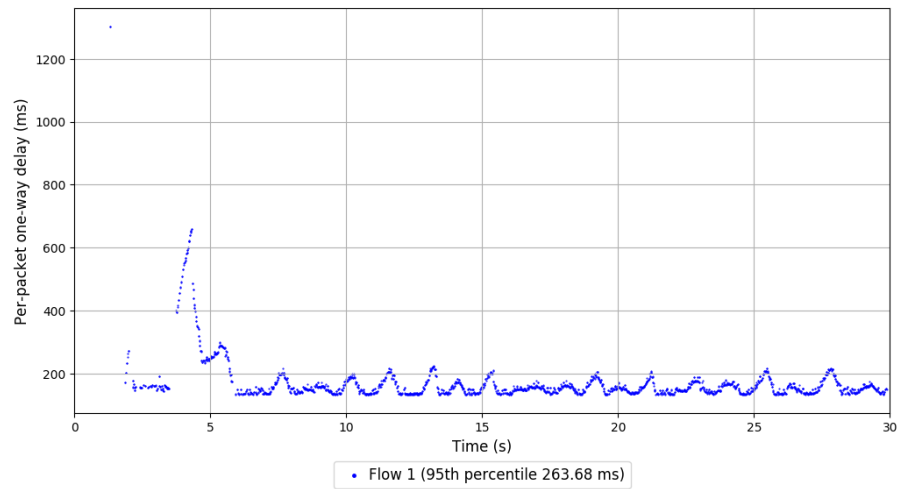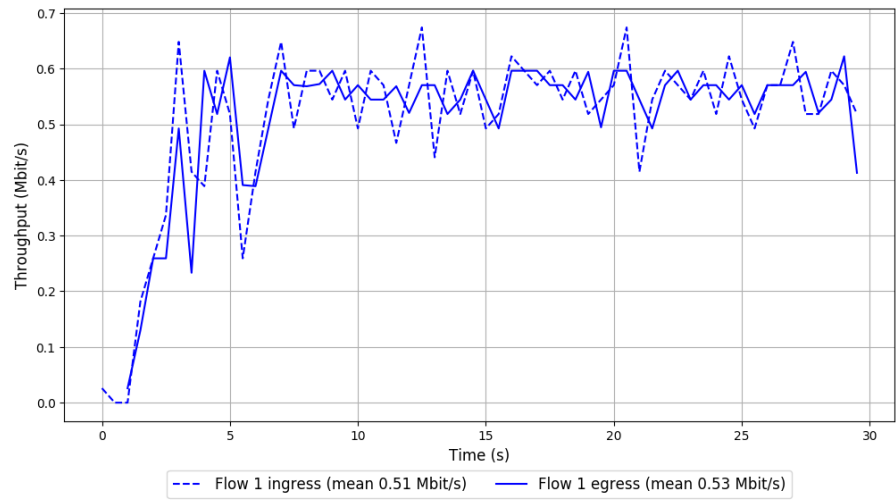Flow 1 (95th percentile 192.15 ms)

```
Run 3: Statistics of Copa

Start at: 2017-08-10 18:18:33
End at: 2017-08-10 18:19:03
Local clock offset: 0.838 ms
Remote clock offset: -2.8 ms


# Below is generated by plot.py at 2017-08-10 19:20:48
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 263.676 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 263.676 ms
Loss rate: 0.86%
```
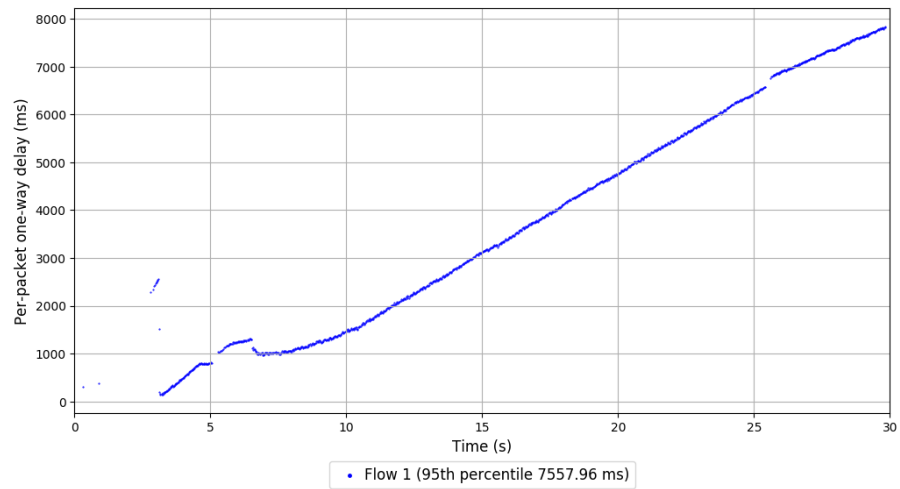
Run 3: Report of Copa — Data Link

Flow 1 ingress (mean 0.51 Mbit/s)   Flow 1 egress (mean 0.53 Mbit/s)

Flow 1 (95th percentile 263.68 ms)

```
Run 1: Statistics of TCP Cubic

Start at: 2017-08-10 17:36:18
End at: 2017-08-10 17:36:48
Local clock offset: 0.244 ms
Remote clock offset: 1.21 ms


# Below is generated by plot.py at 2017-08-10 19:20:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 7557.963 ms
Loss rate: 31.22%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 7557.963 ms
Loss rate: 31.22%
```
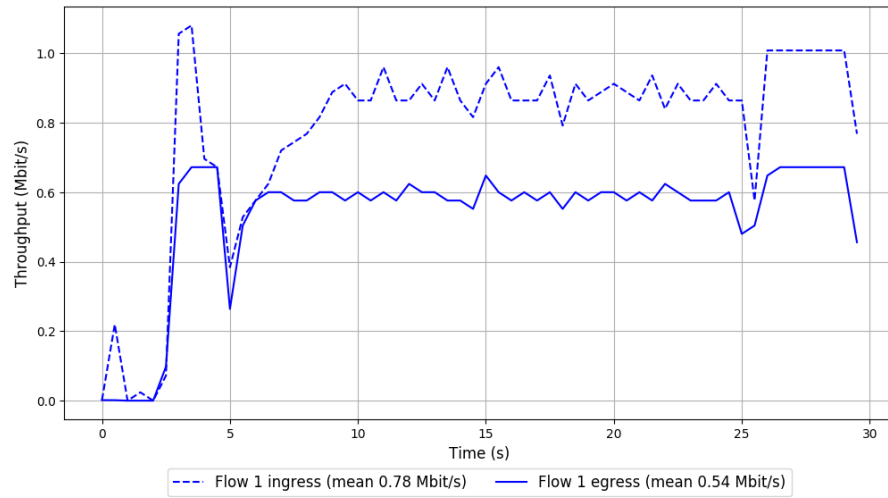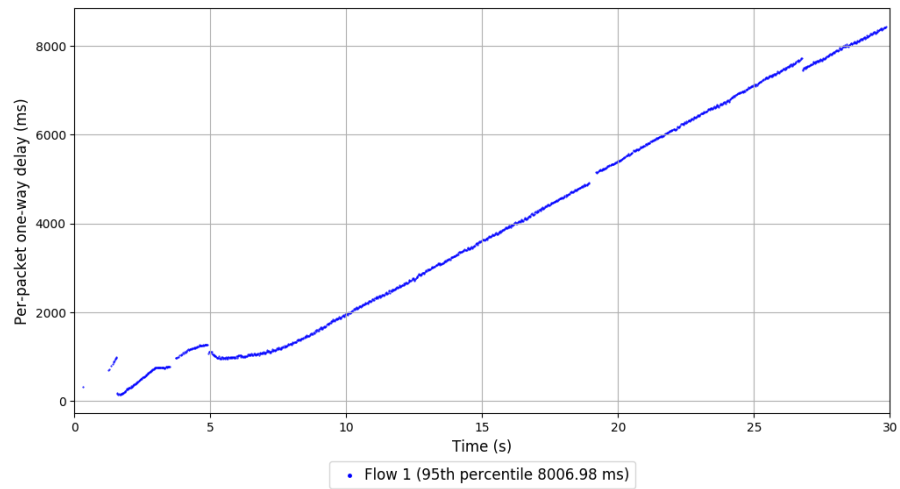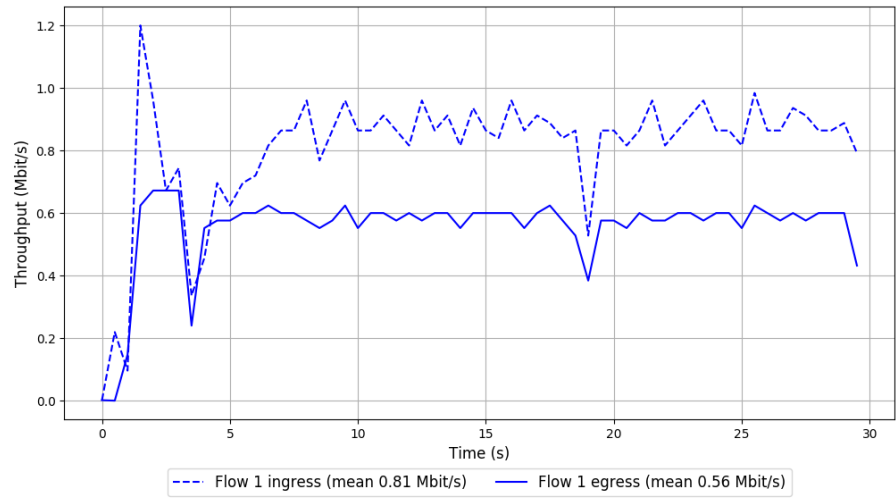
Run 1: Report of TCP Cubic — Data Link

```
Run 2: Statistics of TCP Cubic

Start at: 2017-08-10 17:53:53
End at: 2017-08-10 17:54:23
Local clock offset: 0.506 ms
Remote clock offset: -3.081 ms


# Below is generated by plot.py at 2017-08-10 19:20:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 8006.977 ms
Loss rate: 31.29%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 8006.977 ms
Loss rate: 31.29%
```

Run 2: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.81 Mbit/s)   Flow 1 egress (mean 0.56 Mbit/s)
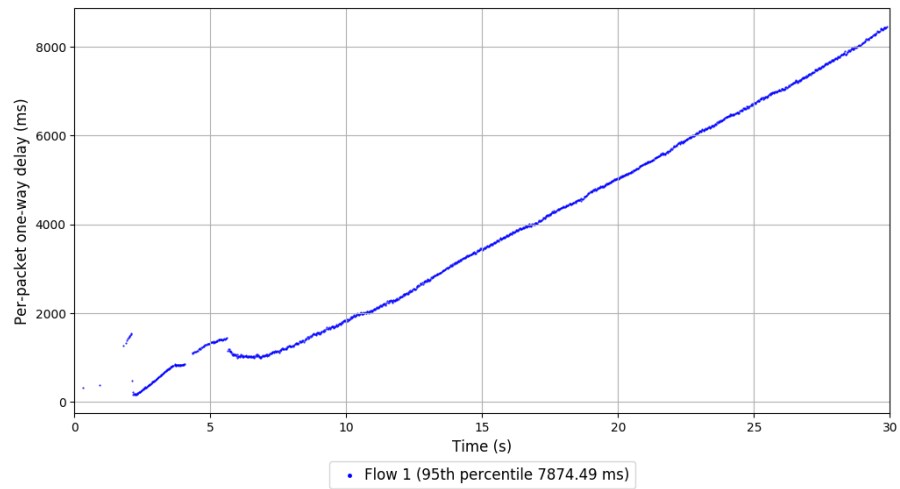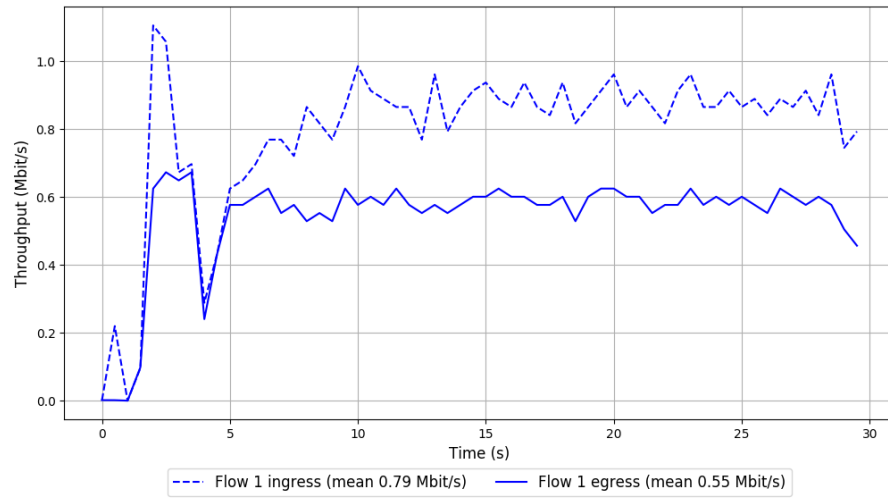

Flow 1 (95th percentile 8006.98 ms)

```
Run 3: Statistics of TCP Cubic

Start at: 2017-08-10 18:11:30
End at: 2017-08-10 18:12:00
Local clock offset: 0.743 ms
Remote clock offset: -2.864 ms


# Below is generated by plot.py at 2017-08-10 19:20:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 7874.489 ms
Loss rate: 31.42%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 7874.489 ms
Loss rate: 31.42%
```

Run 3: Report of TCP Cubic — Data Link

Flow 1 ingress (mean 0.79 Mbit/s) --- Flow 1 egress (mean 0.55 Mbit/s)

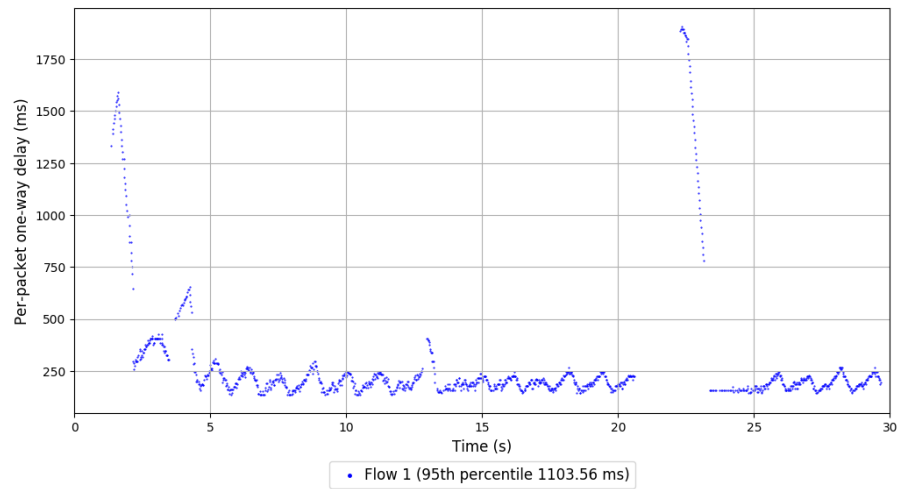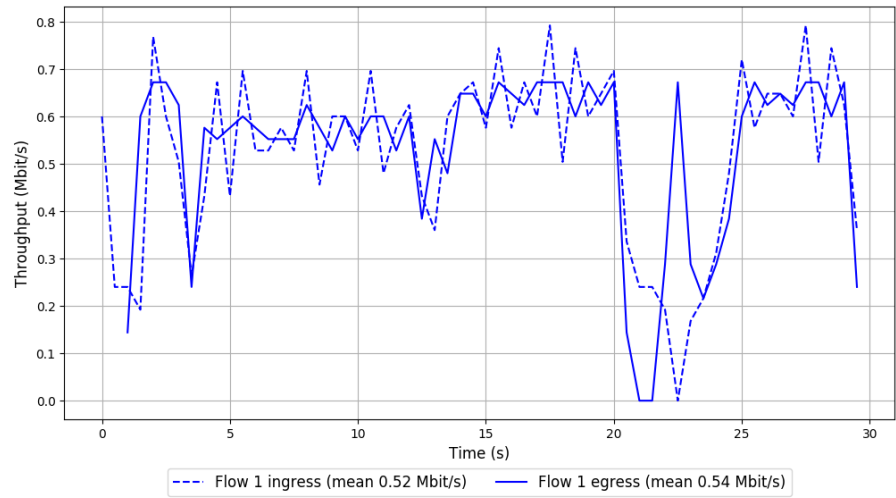

Flow 1 (95th percentile 7874.49 ms)

```
Run 1: Statistics of KohoCC

Start at: 2017-08-10 17:45:41
End at: 2017-08-10 17:46:11
Local clock offset: 0.377 ms
Remote clock offset: -3.512 ms


# Below is generated by plot.py at 2017-08-10 19:20:51
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1103.557 ms
Loss rate: 1.53%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1103.557 ms
Loss rate: 1.53%
```
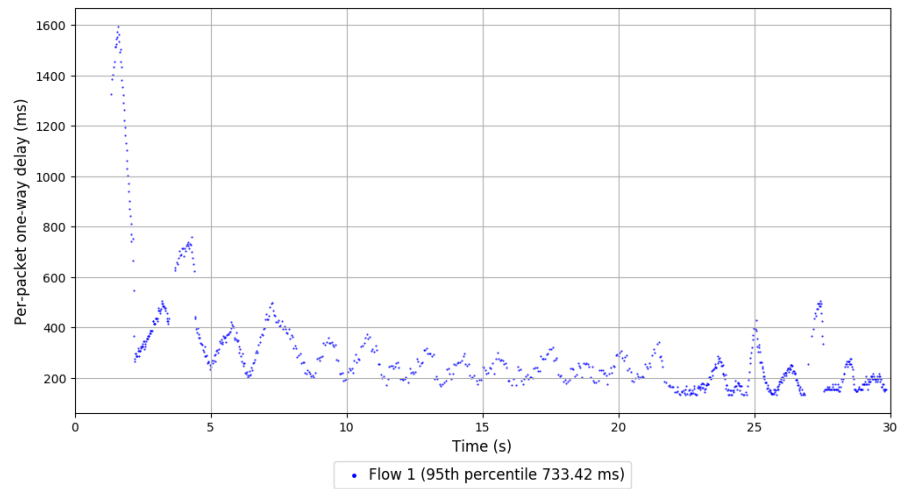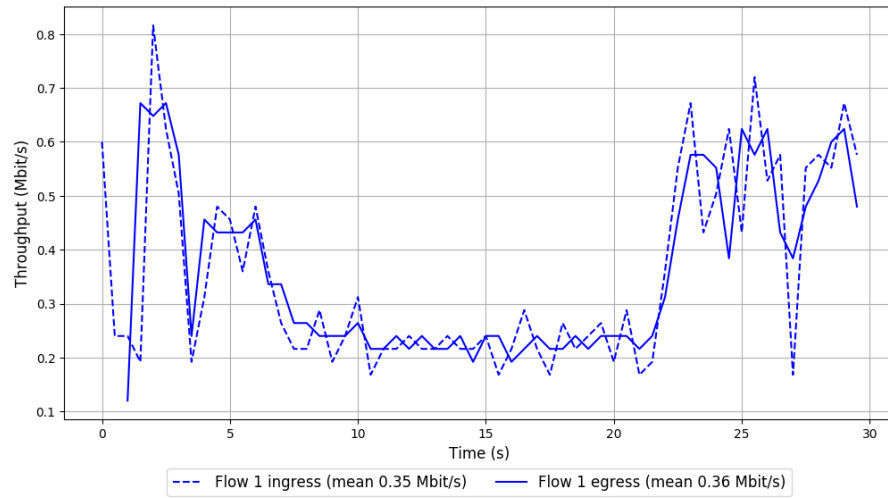
Run 1: Report of KohoCC — Data Link

```
Run 2: Statistics of KohoCC

Start at: 2017-08-10 18:03:17
End at: 2017-08-10 18:03:47
Local clock offset: 0.575 ms
Remote clock offset: -2.841 ms


# Below is generated by plot.py at 2017-08-10 19:20:51
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 733.424 ms
Loss rate: 2.04%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 733.424 ms
Loss rate: 2.04%
```

Run 2: Report of KohoCC — Data Link

Flow 1 ingress (mean 0.35 Mbit/s) ---- Flow 1 egress (mean 0.36 Mbit/s) ——

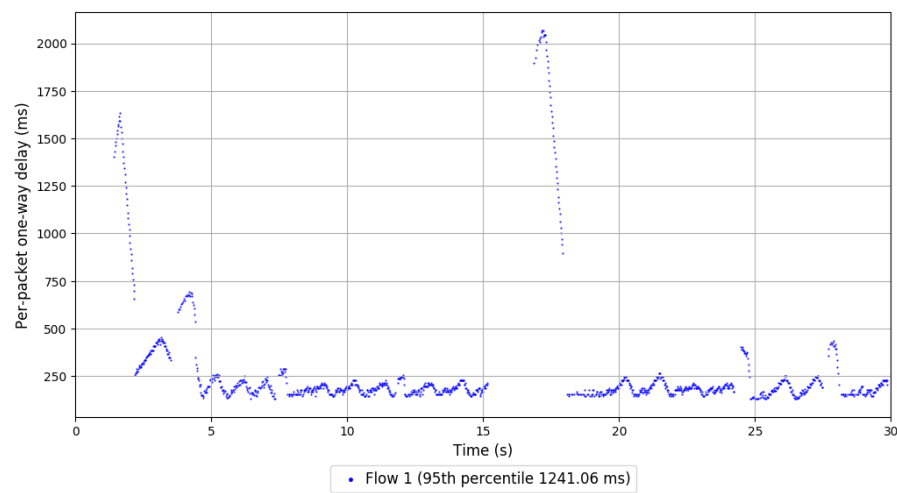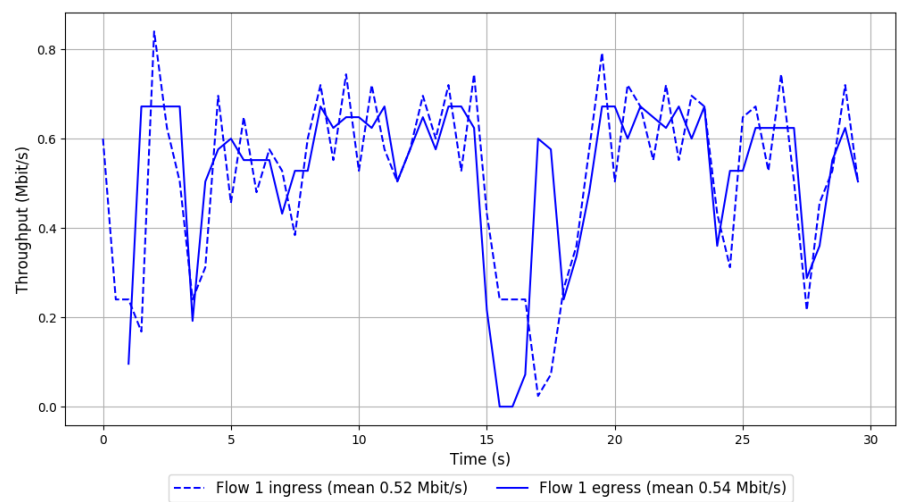Flow 1 (95th percentile 733.42 ms)

```
Run 3: Statistics of KohoCC

Start at: 2017-08-10 18:20:55
End at: 2017-08-10 18:21:25
Local clock offset: 0.833 ms
Remote clock offset: -2.093 ms


# Below is generated by plot.py at 2017-08-10 19:20:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1241.056 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1241.056 ms
Loss rate: 1.24%
```
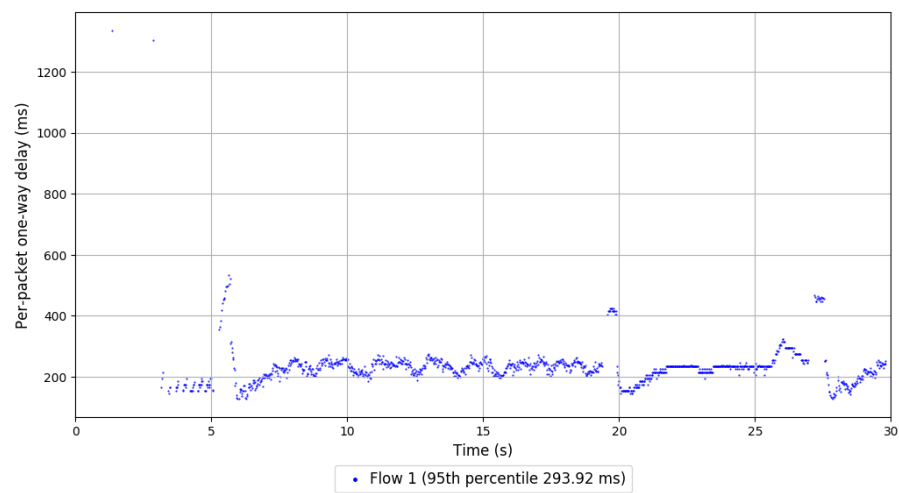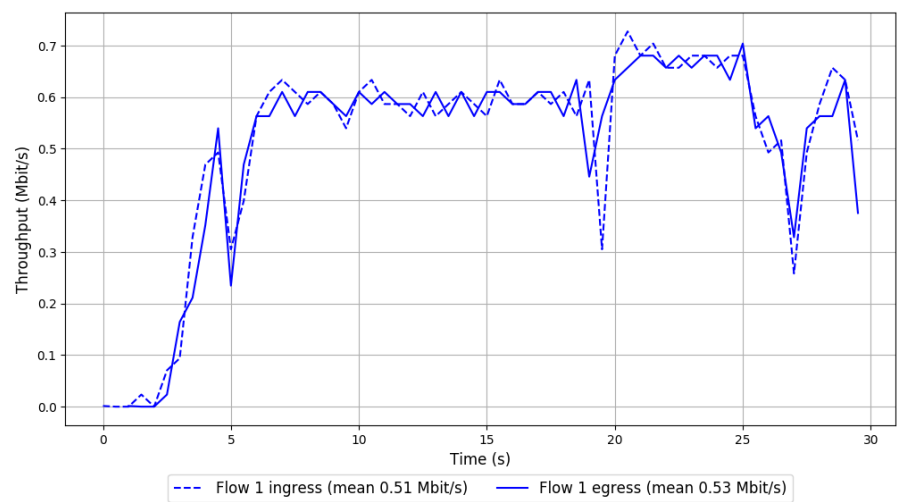
Run 3: Report of KohoCC — Data Link

```
Run 1: Statistics of LEDBAT

Start at: 2017-08-10 17:49:12
End at: 2017-08-10 17:49:42
Local clock offset: 0.369 ms
Remote clock offset: 1.553 ms


# Below is generated by plot.py at 2017-08-10 19:20:52
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 293.915 ms
Loss rate: 1.37%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 293.915 ms
Loss rate: 1.37%
```

Run 1: Report of LEDBAT — Data Link

```
Run 2: Statistics of LEDBAT

Start at: 2017-08-10 18:06:48
End at: 2017-08-10 18:07:18
Local clock offset: 0.704 ms
Remote clock offset: 1.982 ms


# Below is generated by plot.py at 2017-08-10 19:20:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 318.813 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 318.813 ms
Loss rate: 1.09%
```
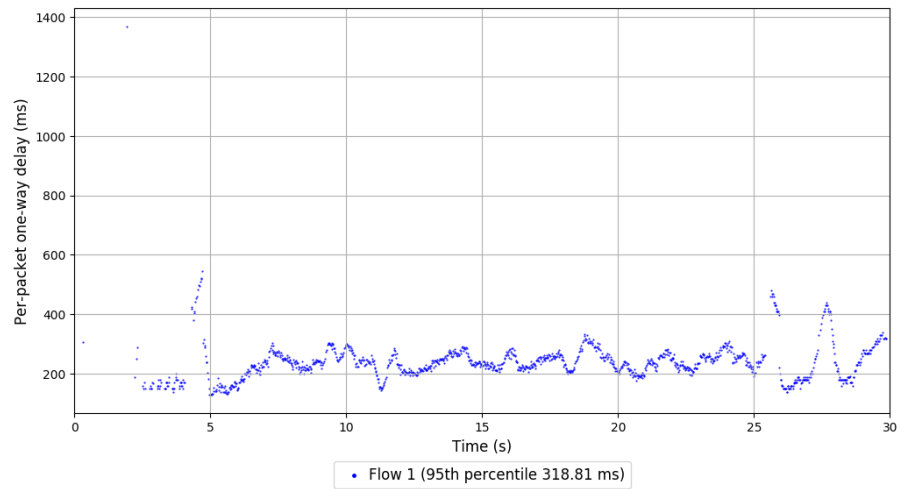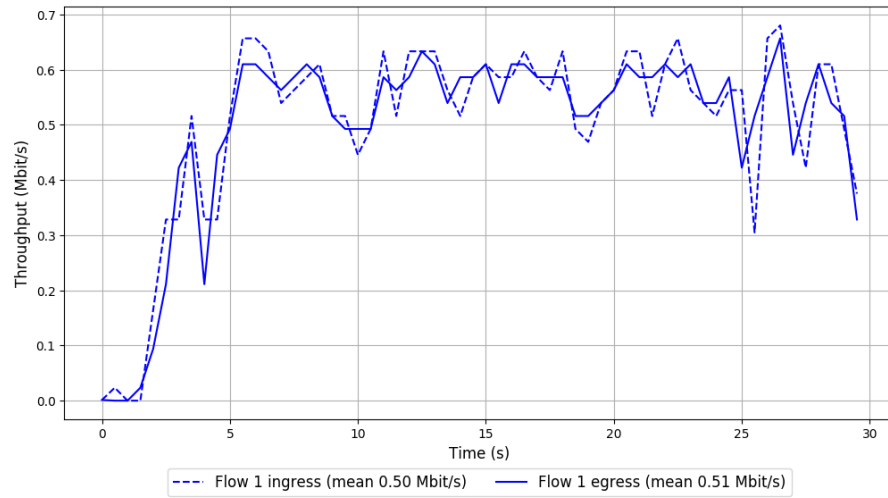
Run 2: Report of LEDBAT — Data Link

```
Run 3: Statistics of LEDBAT

Start at: 2017-08-10 18:24:25
End at: 2017-08-10 18:24:55
Local clock offset: 0.77 ms
Remote clock offset: 3.03 ms

# Below is generated by plot.py at 2017-08-10 19:20:53
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 345.532 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 345.532 ms
Loss rate: 0.00%
```
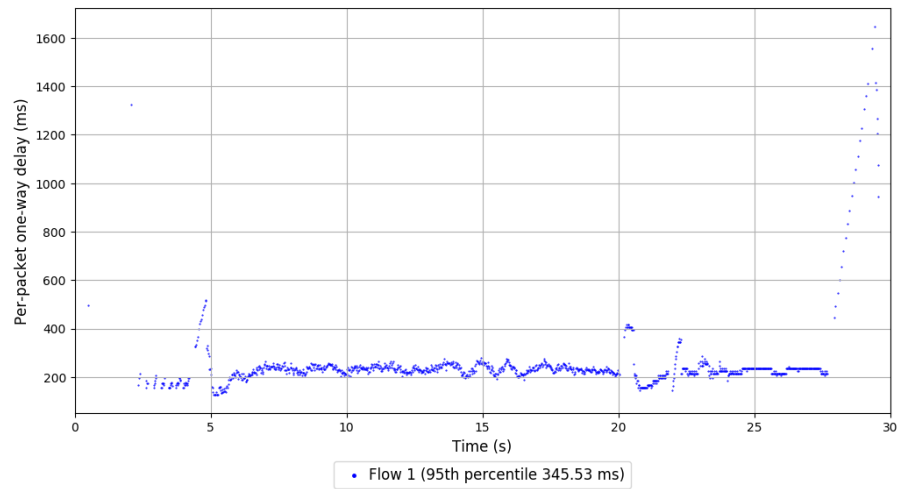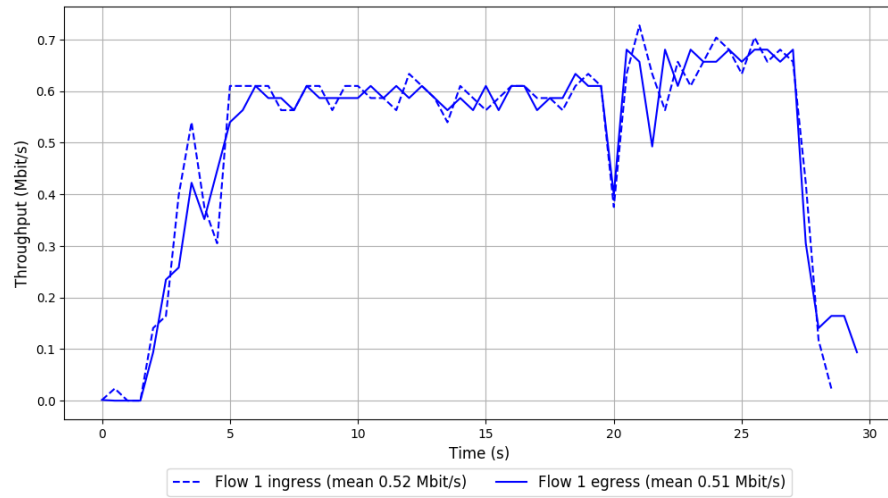
Run 3: Report of LEDBAT — Data Link

Flow 1 ingress (mean 0.52 Mbit/s) --- Flow 1 egress (mean 0.51 Mbit/s)
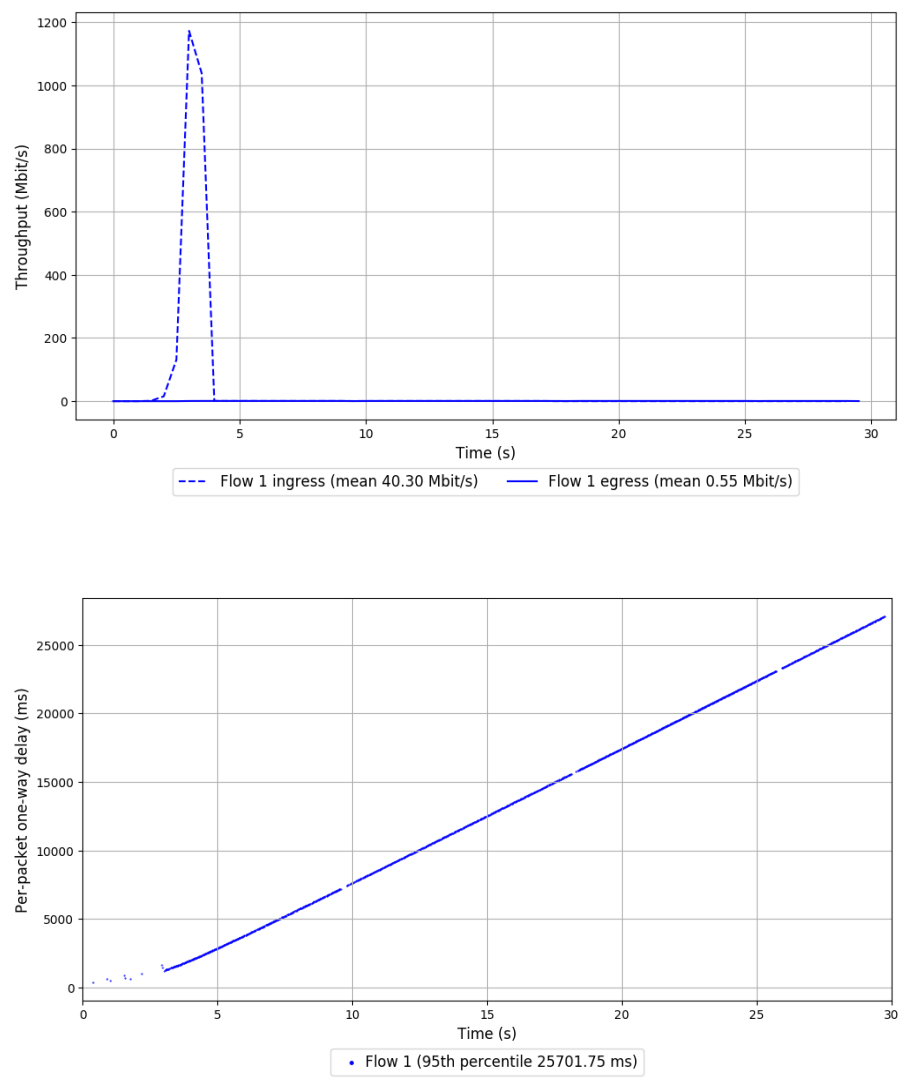

Flow 1 (95th percentile 345.53 ms)

```
Run 1: Statistics of PCC

Start at: 2017-08-10 17:38:38
End at: 2017-08-10 17:39:08
Local clock offset: 0.299 ms
Remote clock offset: 1.392 ms


# Below is generated by plot.py at 2017-08-10 19:20:55
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 25701.747 ms
Loss rate: 98.63%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 25701.747 ms
Loss rate: 98.63%
```

Run 1: Report of PCC — Data Link

Flow 1 ingress (mean 40.30 Mbit/s)   Flow 1 egress (mean 0.55 Mbit/s)

Flow 1 (95th percentile 25701.75 ms)

```
Run 2: Statistics of PCC

Start at: 2017-08-10 17:56:14
End at: 2017-08-10 17:56:44
Local clock offset: 0.558 ms
Remote clock offset: 2.024 ms


# Below is generated by plot.py at 2017-08-10 19:20:55
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 25522.879 ms
Loss rate: 98.34%
-- Flow 1:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 25522.879 ms
Loss rate: 98.34%
```
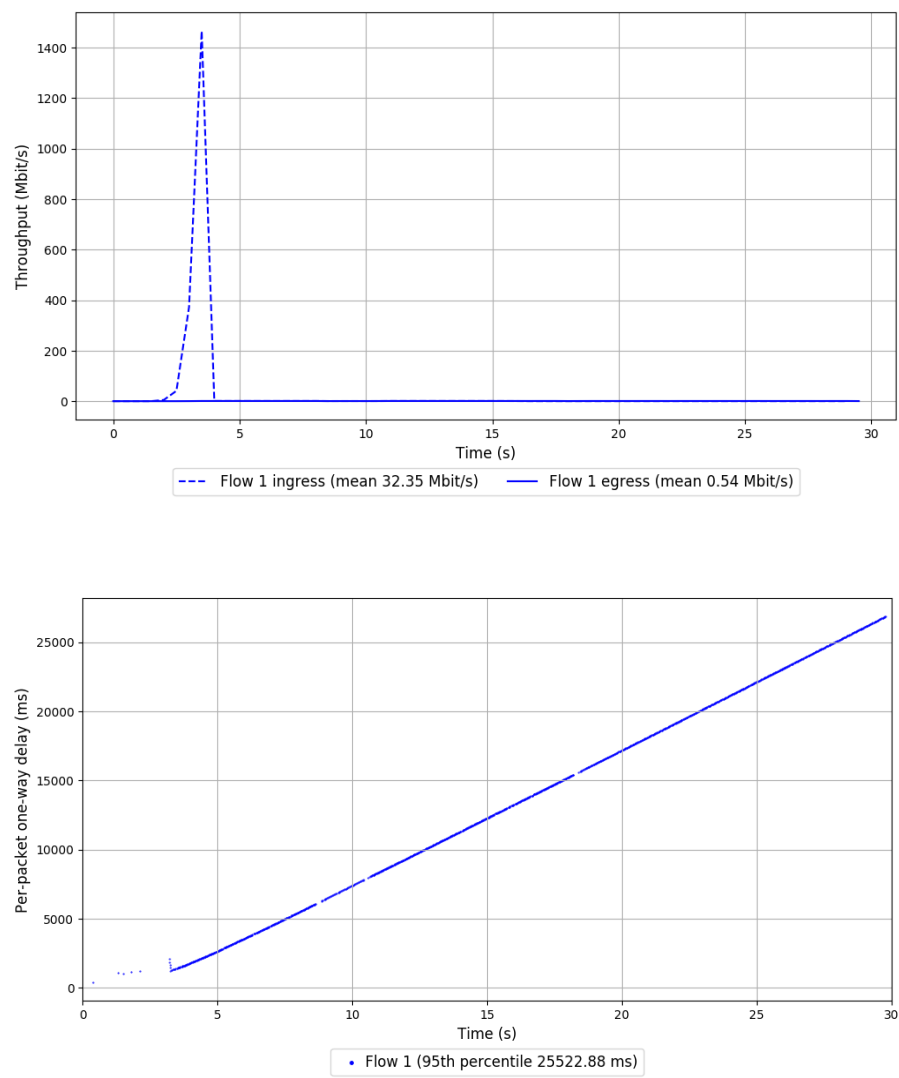
Run 2: Report of PCC — Data Link

Flow 1 ingress (mean 32.35 Mbit/s) --- Flow 1 egress (mean 0.54 Mbit/s)

• Flow 1 (95th percentile 25522.88 ms)

```
Run 3: Statistics of PCC

Start at: 2017-08-10 18:13:50
End at: 2017-08-10 18:14:20
Local clock offset: 0.733 ms
Remote clock offset: 1.979 ms


# Below is generated by plot.py at 2017-08-10 19:20:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 26114.872 ms
Loss rate: 98.69%
-- Flow 1:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 26114.872 ms
Loss rate: 98.69%
```
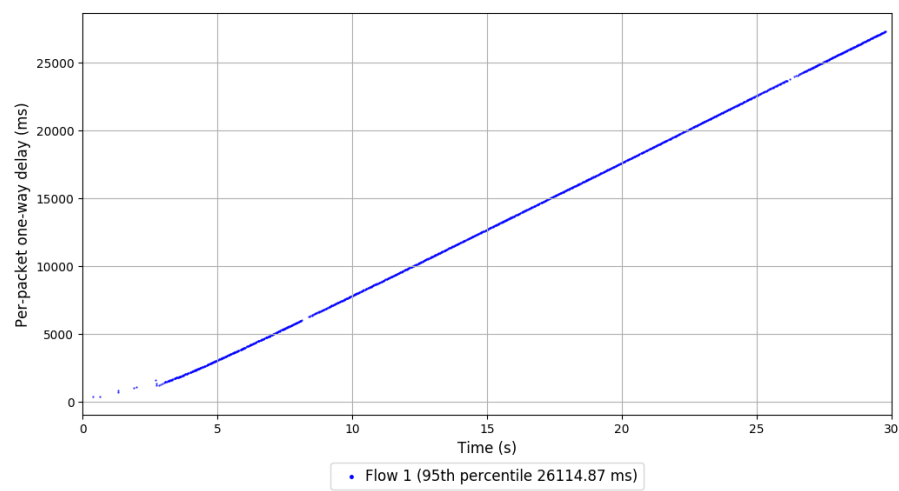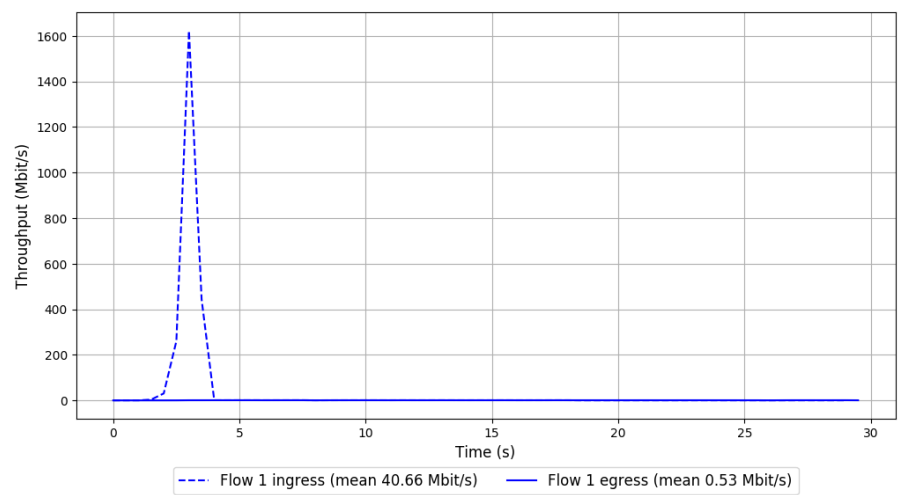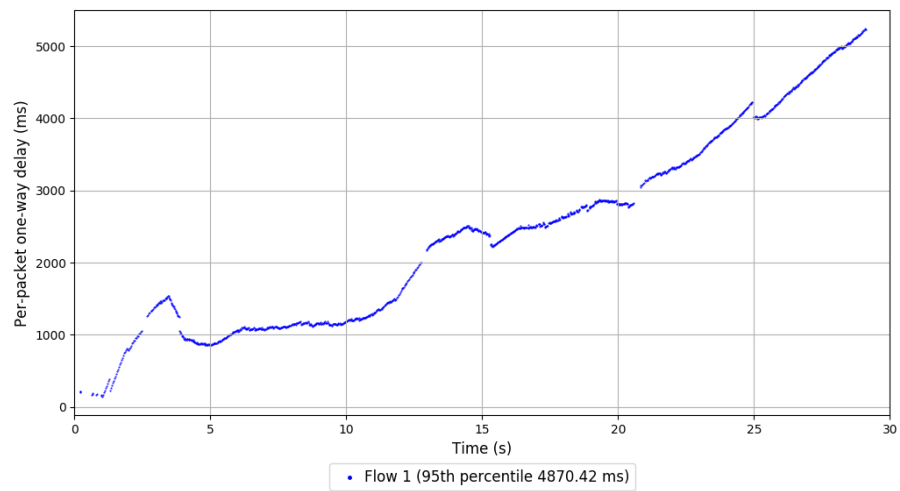
Run 3: Report of PCC — Data Link

Flow 1 ingress (mean 40.66 Mbit/s)   Flow 1 egress (mean 0.53 Mbit/s)

Flow 1 (95th percentile 26114.87 ms)

```
Run 1: Statistics of QUIC Cubic

Start at: 2017-08-10 17:37:28
End at: 2017-08-10 17:37:58
Local clock offset: 0.223 ms
Remote clock offset: 1.657 ms


# Below is generated by plot.py at 2017-08-10 19:20:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 4870.417 ms
Loss rate: 23.26%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 4870.417 ms
Loss rate: 23.26%
```
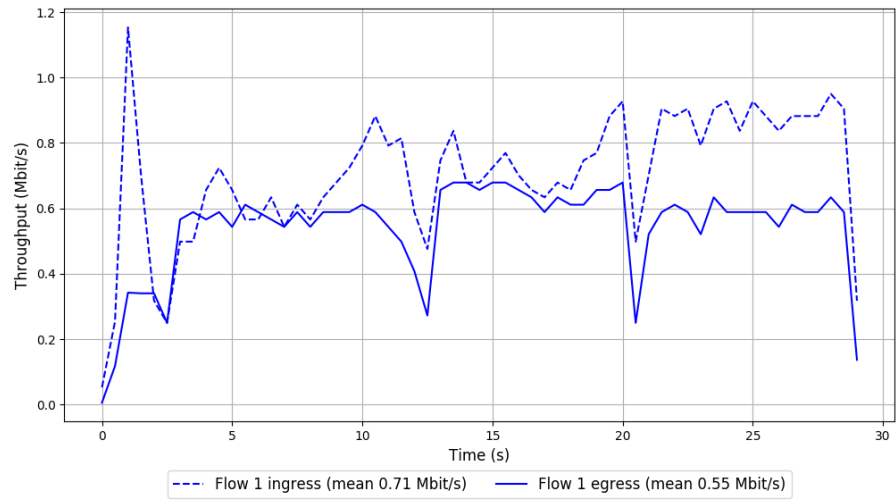
Run 1: Report of QUIC Cubic — Data Link

```
Run 2: Statistics of QUIC Cubic

Start at: 2017-08-10 17:55:03
End at: 2017-08-10 17:55:33
Local clock offset: 0.525 ms
Remote clock offset: -3.439 ms


# Below is generated by plot.py at 2017-08-10 19:20:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 6642.818 ms
Loss rate: 29.85%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 6642.818 ms
Loss rate: 29.85%
```
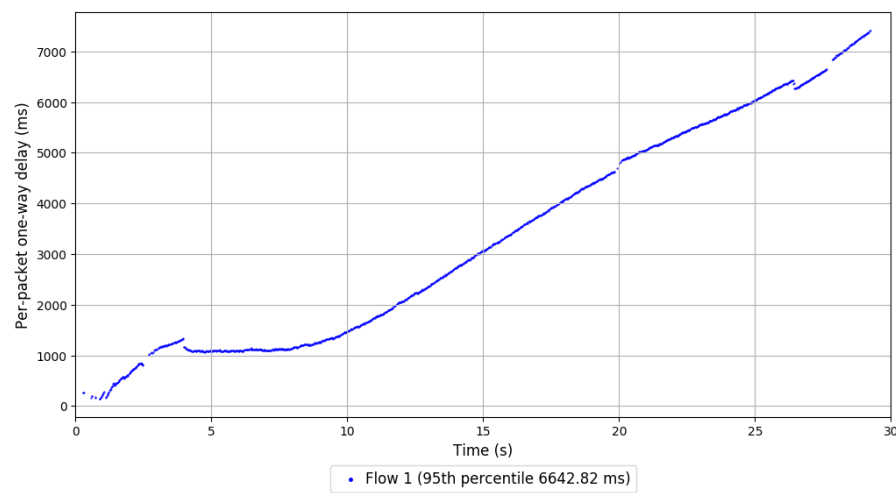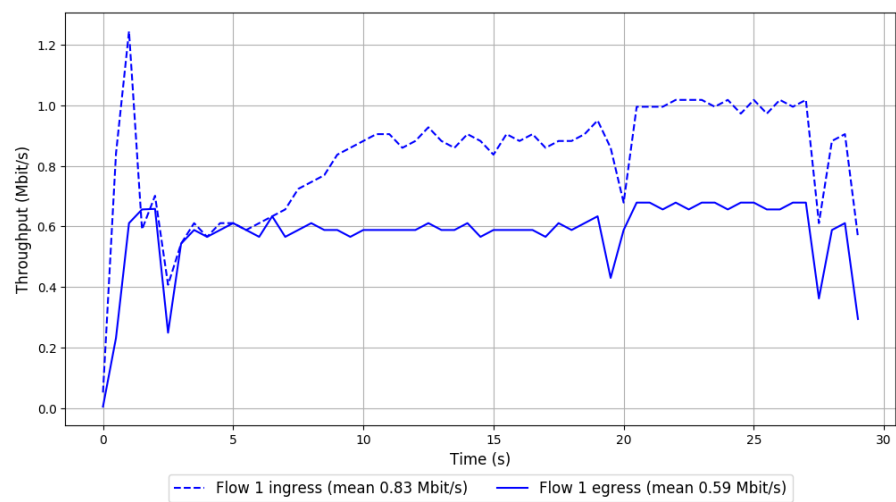
Run 2: Report of QUIC Cubic — Data Link

```
Run 3: Statistics of QUIC Cubic

Start at: 2017-08-10 18:12:40
End at: 2017-08-10 18:13:10
Local clock offset: 0.791 ms
Remote clock offset: -2.998 ms


# Below is generated by plot.py at 2017-08-10 19:20:58
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 6913.630 ms
Loss rate: 23.15%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 6913.630 ms
Loss rate: 23.15%
```
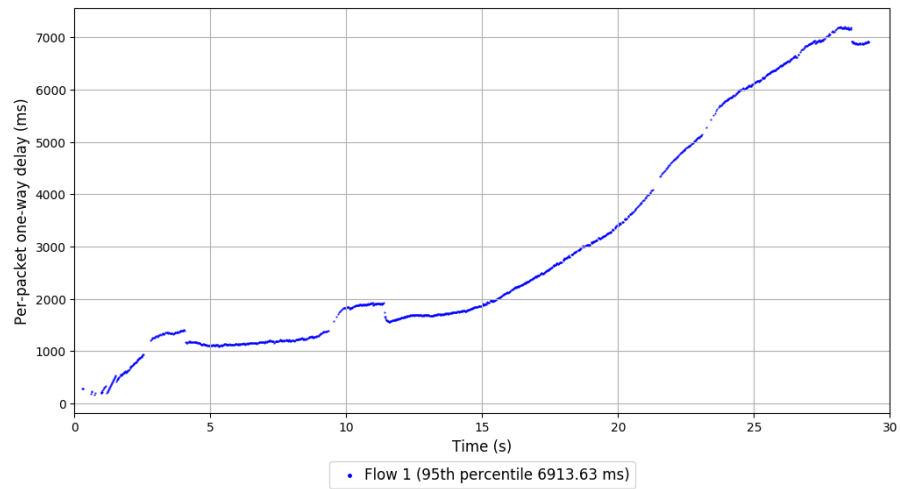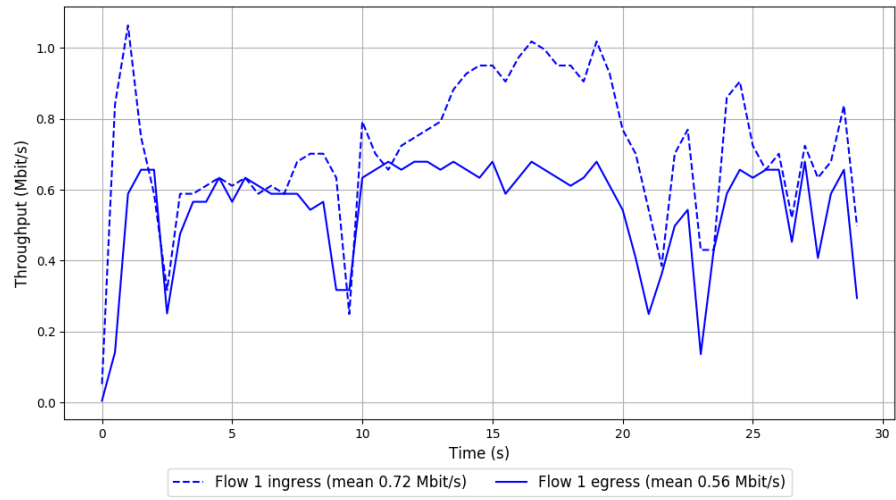
Run 3: Report of QUIC Cubic — Data Link

Flow 1 ingress (mean 0.72 Mbit/s)   Flow 1 egress (mean 0.56 Mbit/s)
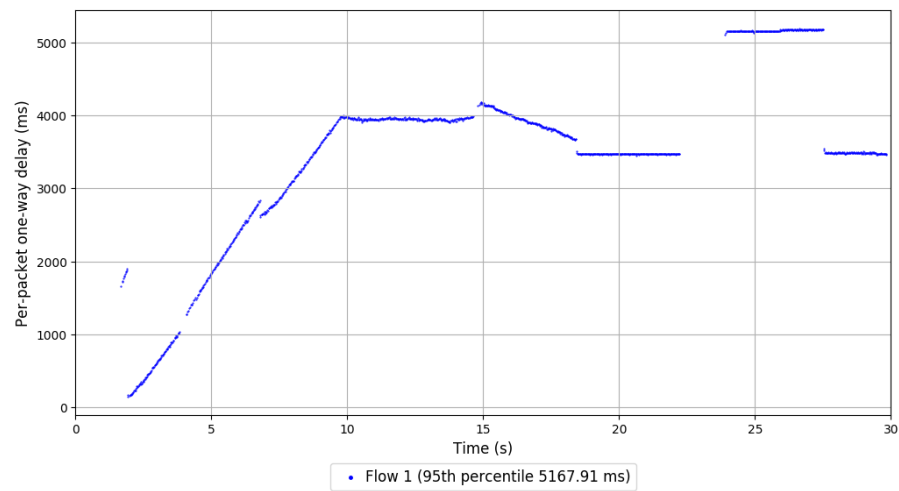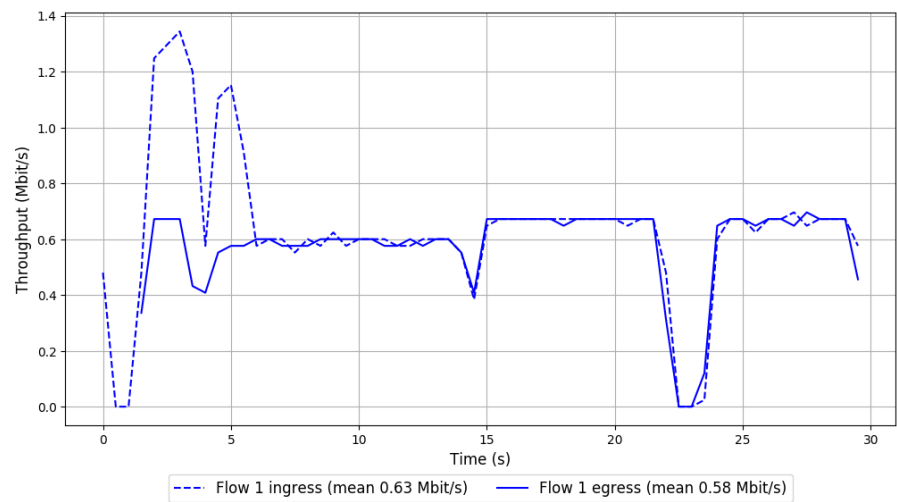

Flow 1 (95th percentile 6913.63 ms)

```
Run 1: Statistics of Saturator

Start at: 2017-08-10 17:44:31
End at: 2017-08-10 17:45:01
Local clock offset: 0.282 ms
Remote clock offset: -3.011 ms


# Below is generated by plot.py at 2017-08-10 19:20:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 5167.915 ms
Loss rate: 13.11%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 5167.915 ms
Loss rate: 13.11%
```

Run 1: Report of Saturator — Data Link

```
Run 2: Statistics of Saturator

Start at: 2017-08-10 18:02:07
End at: 2017-08-10 18:02:37
Local clock offset: 0.632 ms
Remote clock offset: 1.884 ms


# Below is generated by plot.py at 2017-08-10 19:20:59
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 3984.981 ms
Loss rate: 12.88%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 3984.981 ms
Loss rate: 12.88%
```
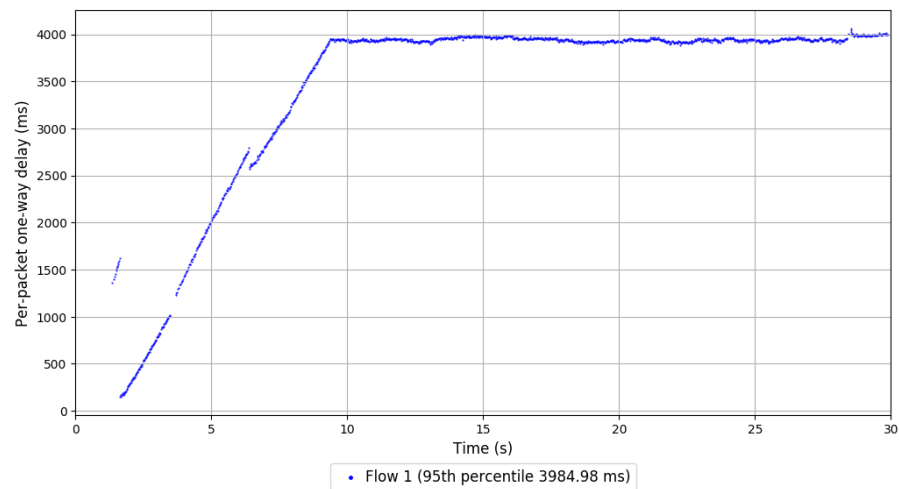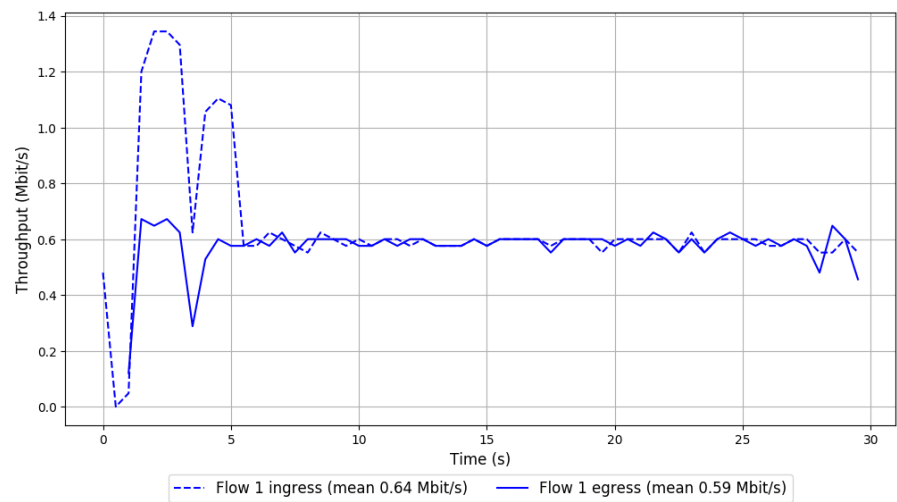
Run 2: Report of Saturator — Data Link

Flow 1 ingress (mean 0.64 Mbit/s)   Flow 1 egress (mean 0.59 Mbit/s)

Flow 1 (95th percentile 3984.98 ms)

```
Run 3: Statistics of Saturator

Start at: 2017-08-10 18:19:44
End at: 2017-08-10 18:20:14
Local clock offset: 0.778 ms
Remote clock offset: 2.763 ms


# Below is generated by plot.py at 2017-08-10 19:21:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 3988.903 ms
Loss rate: 13.03%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 3988.903 ms
Loss rate: 13.03%
```
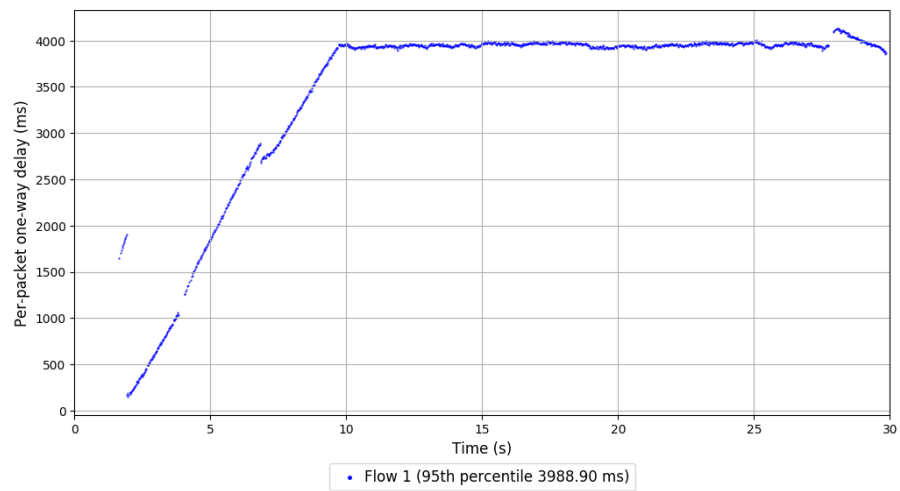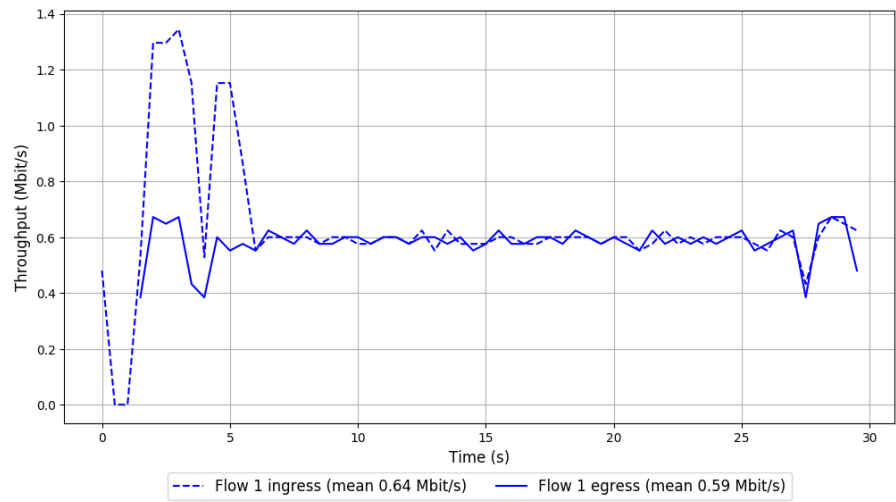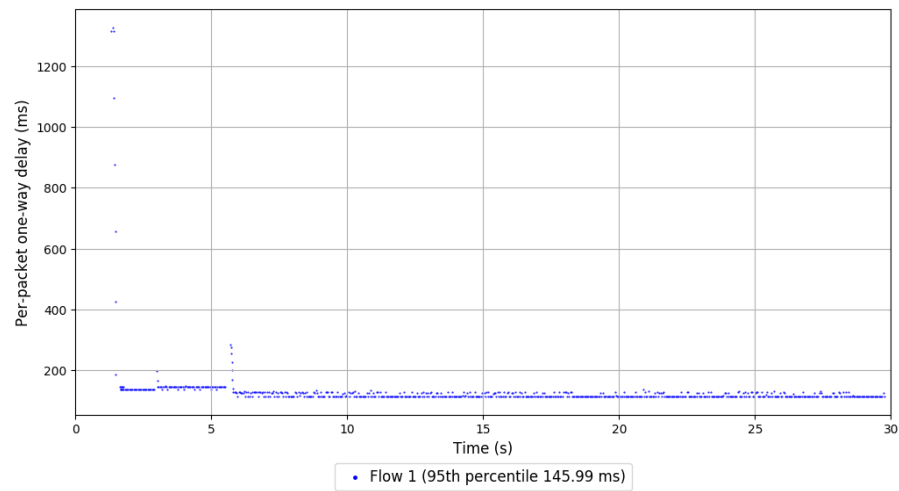
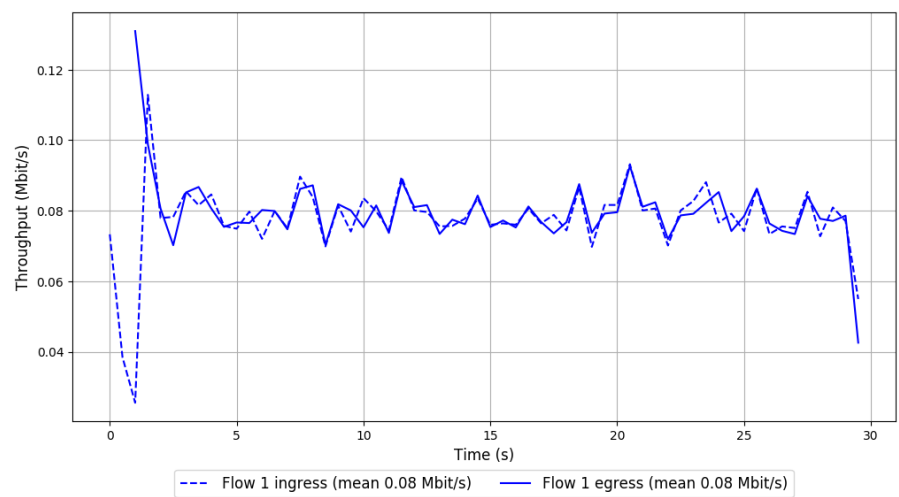Run 3: Report of Saturator — Data Link

```
Run 1: Statistics of SCReAM

Start at: 2017-08-10 17:50:22
End at: 2017-08-10 17:50:52
Local clock offset: 0.455 ms
Remote clock offset: 1.538 ms


# Below is generated by plot.py at 2017-08-10 19:21:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 145.991 ms
Loss rate: 0.66%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 145.991 ms
Loss rate: 0.66%
```
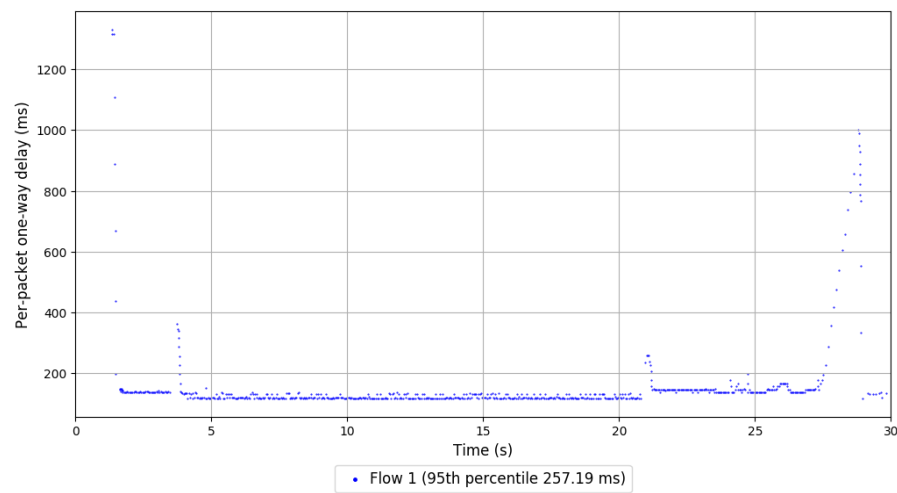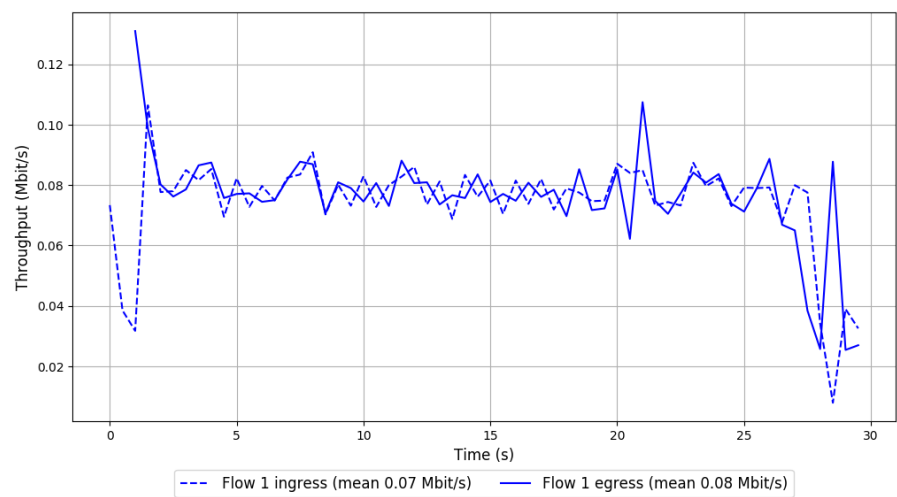
Run 1: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.08 Mbit/s)   Flow 1 egress (mean 0.08 Mbit/s)

Flow 1 (95th percentile 145.99 ms)

```
Run 2: Statistics of SCReAM

Start at: 2017-08-10 18:07:58
End at: 2017-08-10 18:08:29
Local clock offset: 0.729 ms
Remote clock offset: -3.354 ms


# Below is generated by plot.py at 2017-08-10 19:21:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 257.185 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 257.185 ms
Loss rate: 0.43%
```

Run 2: Report of SCReAM — Data Link

Flow 1 ingress (mean 0.07 Mbit/s) --- Flow 1 egress (mean 0.08 Mbit/s)

Flow 1 (95th percentile 257.19 ms)

```
Run 3: Statistics of SCReAM

Start at: 2017-08-10 18:25:35
End at: 2017-08-10 18:26:05
Local clock offset: 0.859 ms
Remote clock offset: 2.954 ms


# Below is generated by plot.py at 2017-08-10 19:21:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 138.156 ms
Loss rate: 0.65%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 138.156 ms
Loss rate: 0.65%
```
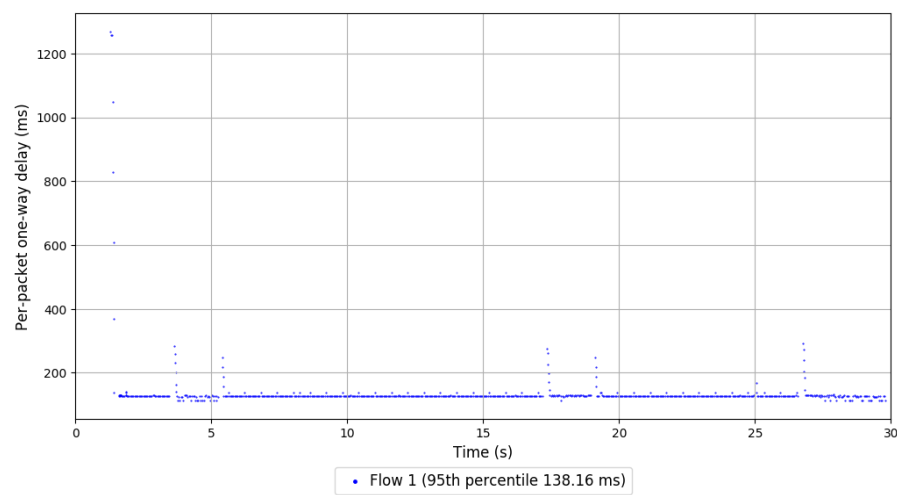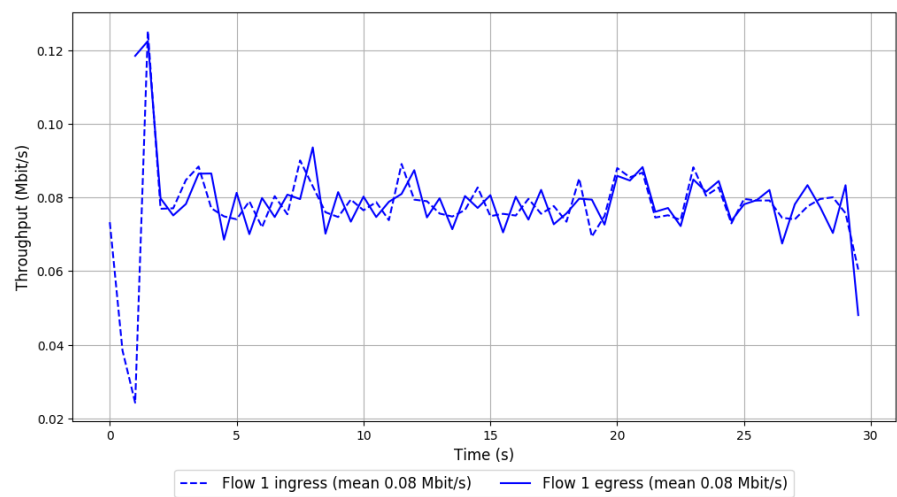
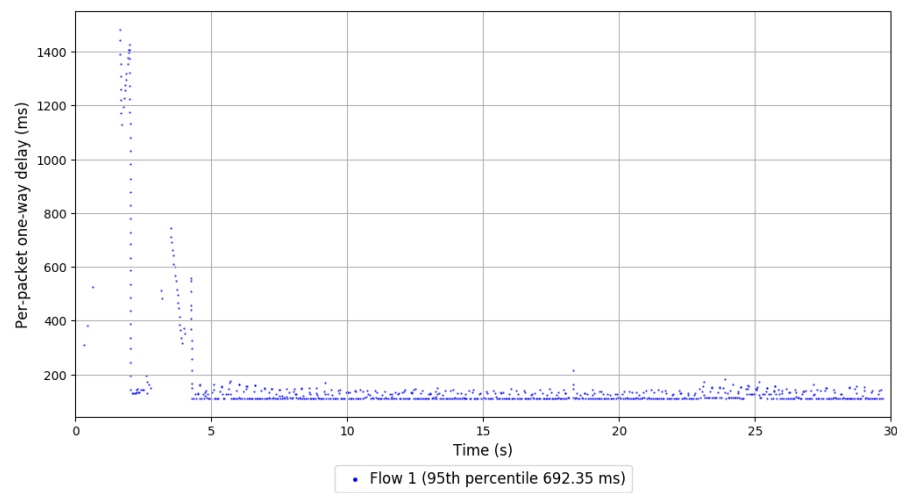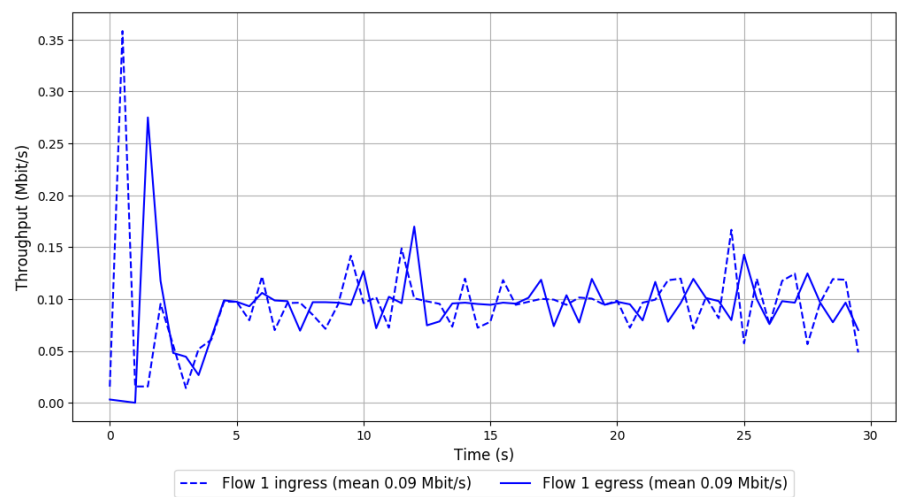Run 3: Report of SCReAM — Data Link

```
Run 1: Statistics of Sprout

Start at: 2017-08-10 17:51:32
End at: 2017-08-10 17:52:02
Local clock offset: 0.462 ms
Remote clock offset: 1.493 ms


# Below is generated by plot.py at 2017-08-10 19:21:02
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 692.351 ms
Loss rate: 1.84%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 692.351 ms
Loss rate: 1.84%
```

Run 1: Report of Sprout — Data Link

```
Run 2: Statistics of Sprout

Start at: 2017-08-10 18:09:09
End at: 2017-08-10 18:09:39
Local clock offset: 0.746 ms
Remote clock offset: 1.487 ms


# Below is generated by plot.py at 2017-08-10 19:21:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 780.714 ms
Loss rate: 1.64%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 780.714 ms
Loss rate: 1.64%
```
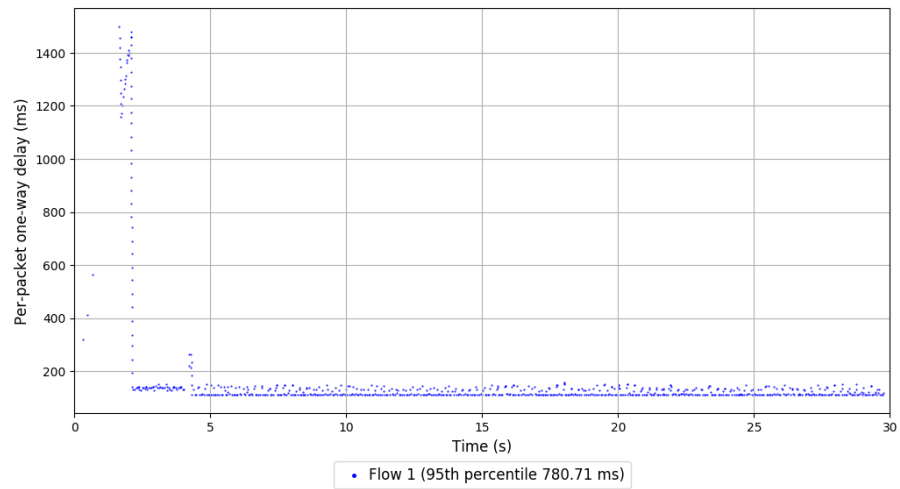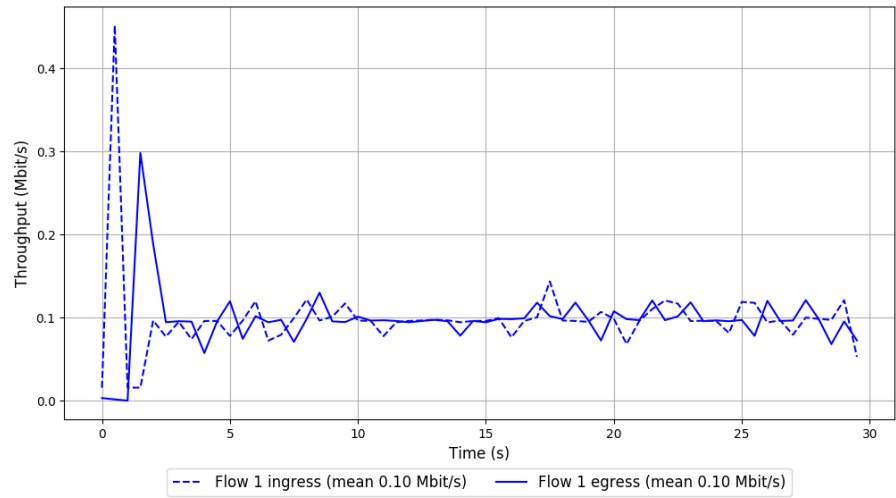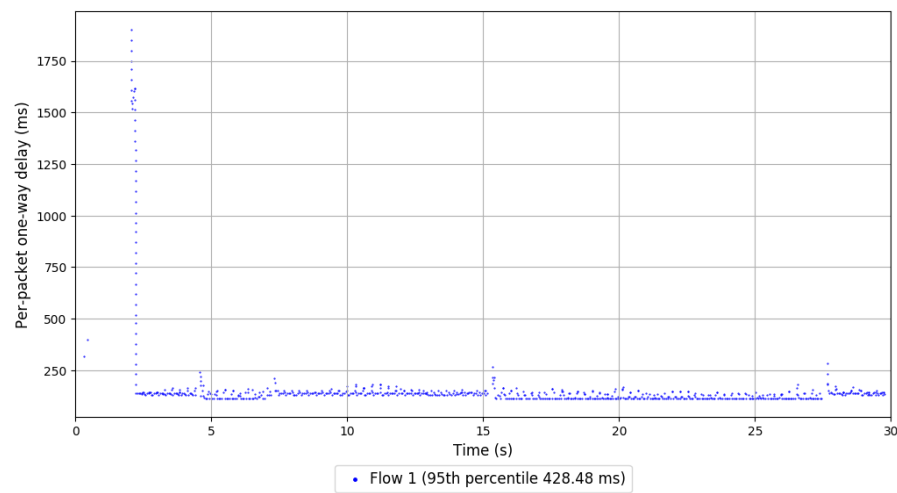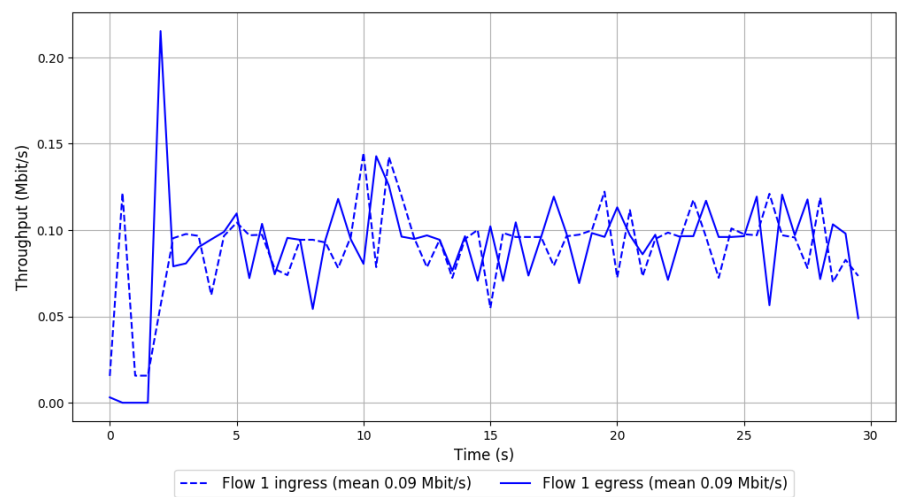
Run 2: Report of Sprout — Data Link

```
Run 3: Statistics of Sprout

Start at: 2017-08-10 18:26:47
End at: 2017-08-10 18:27:17
Local clock offset: 0.778 ms
Remote clock offset: -2.061 ms


# Below is generated by plot.py at 2017-08-10 19:21:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 428.480 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 428.480 ms
Loss rate: 0.54%
```

Run 3: Report of Sprout — Data Link

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

Flow 1 (95th percentile 428.48 ms)

69

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

Start at: 2017-08-10 17:42:10
End at: 2017-08-10 17:42:40
Local clock offset: 0.317 ms
Remote clock offset: -3.552 ms

# Below is generated by plot.py at 2017-08-10 19:21:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1346.200 ms
Loss rate: 2.77%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1346.200 ms
Loss rate: 2.77%
```
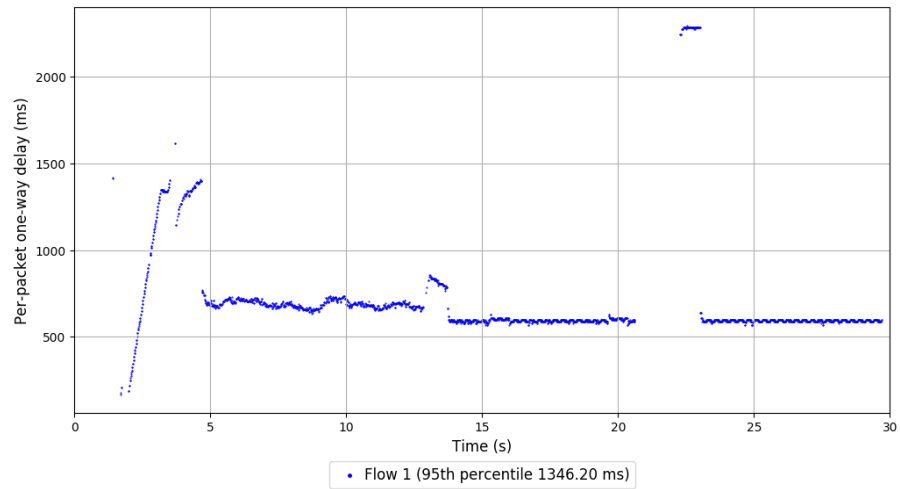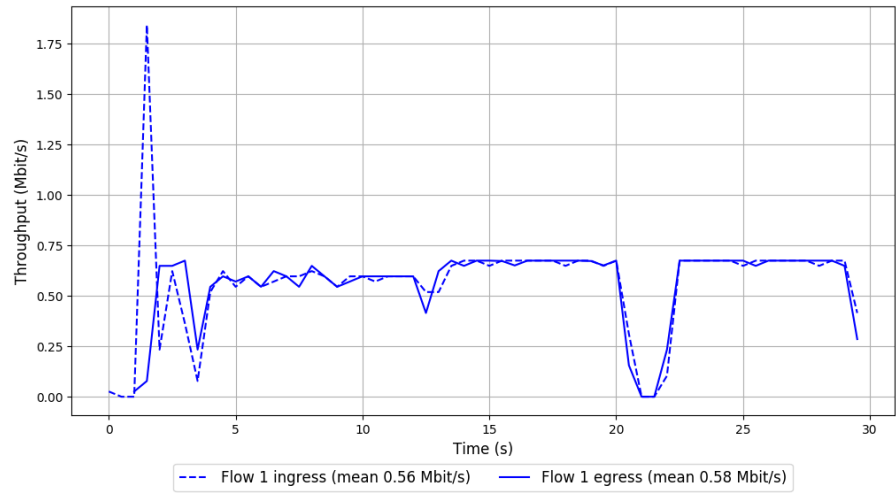
Run 1: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 0.56 Mbit/s) — — — Flow 1 egress (mean 0.58 Mbit/s)

Flow 1 (95th percentile 1346.20 ms)

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

Start at: 2017-08-10 17:59:47
End at: 2017-08-10 18:00:17
Local clock offset: 0.599 ms
Remote clock offset: 1.937 ms

# Below is generated by plot.py at 2017-08-10 19:21:04
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1076.688 ms
Loss rate: 2.67%
-- Flow 1:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1076.688 ms
Loss rate: 2.67%
```
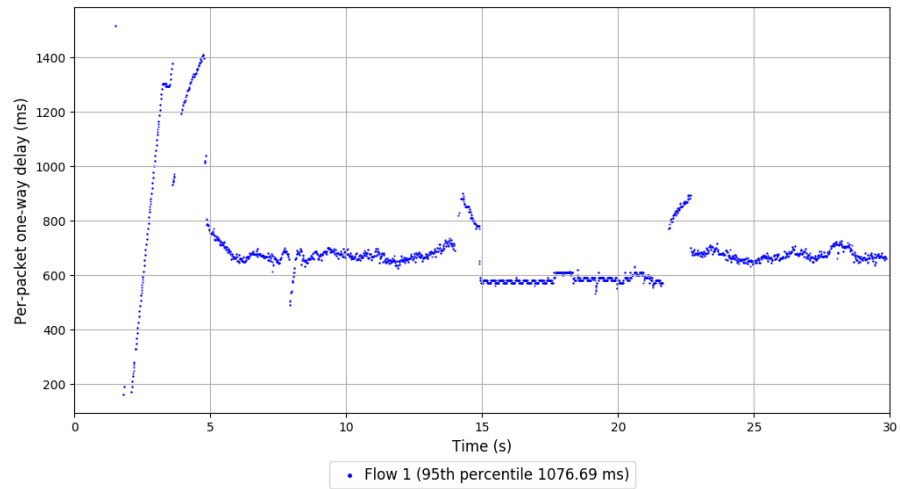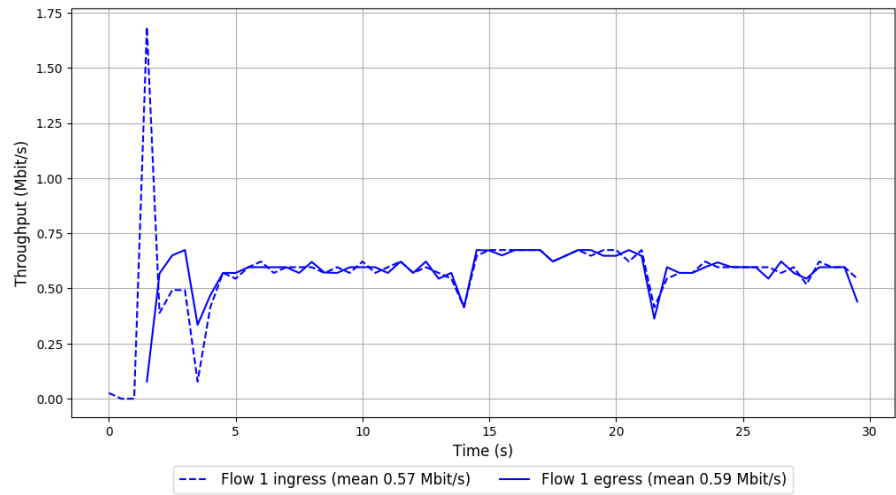
Run 2: Report of TaoVA-100x — Data Link

Flow 1 ingress (mean 0.57 Mbit/s) --- Flow 1 egress (mean 0.59 Mbit/s)

Flow 1 (95th percentile 1076.69 ms)

73

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

Start at: 2017-08-10 18:17:23
End at: 2017-08-10 18:17:53
Local clock offset: 0.864 ms
Remote clock offset: -2.972 ms

# Below is generated by plot.py at 2017-08-10 19:21:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 1113.186 ms
Loss rate: 2.56%
-- Flow 1:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 1113.186 ms
Loss rate: 2.56%
```
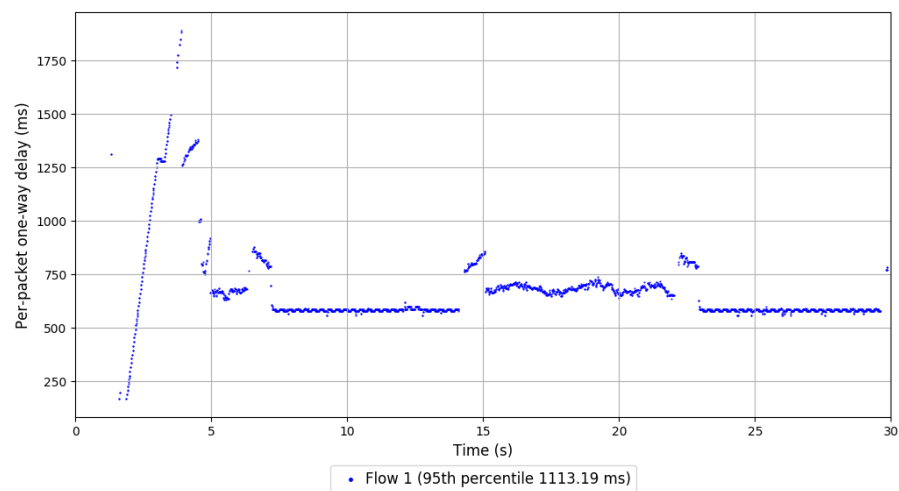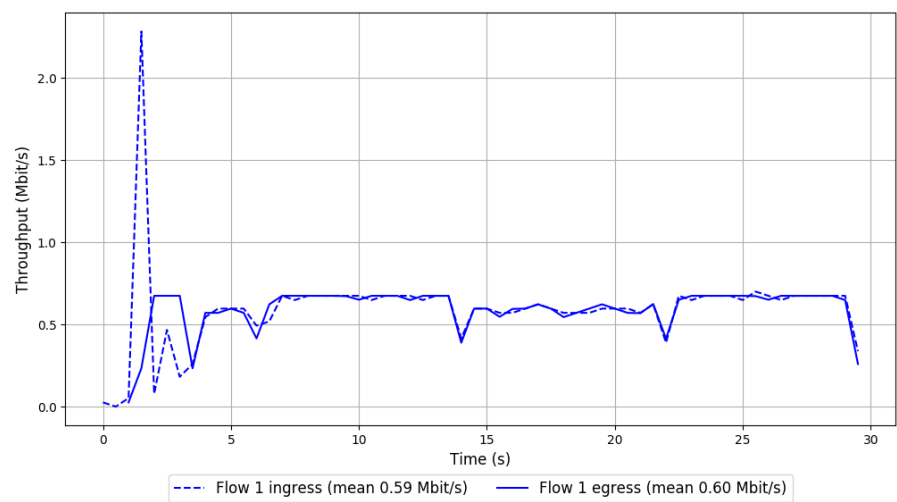
Run 3: Report of TaoVA-100x — Data Link

75

```
Run 1: Statistics of TCP Vegas

Start at: 2017-08-10 17:48:02
End at: 2017-08-10 17:48:32
Local clock offset: 0.411 ms
Remote clock offset: 1.921 ms


# Below is generated by plot.py at 2017-08-10 19:21:05
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1099.598 ms
Loss rate: 1.41%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1099.598 ms
Loss rate: 1.41%
```
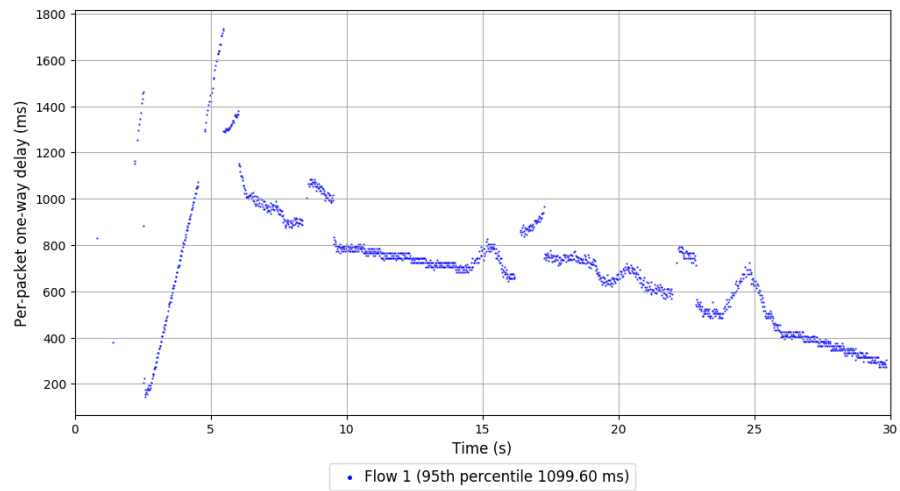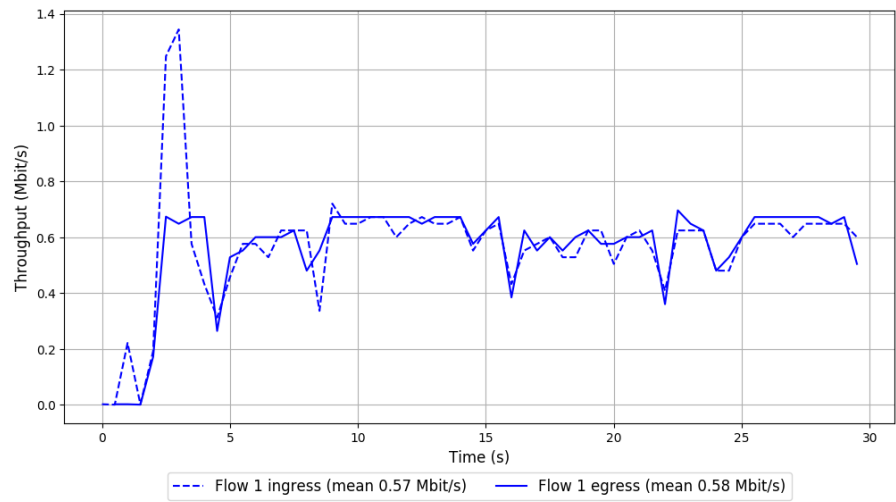
Run 1: Report of TCP Vegas — Data Link

```
Run 2: Statistics of TCP Vegas

Start at: 2017-08-10 18:05:38
End at: 2017-08-10 18:06:08
Local clock offset: 0.685 ms
Remote clock offset: 1.944 ms


# Below is generated by plot.py at 2017-08-10 19:21:06
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 1510.813 ms
Loss rate: 2.82%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 1510.813 ms
Loss rate: 2.82%
```
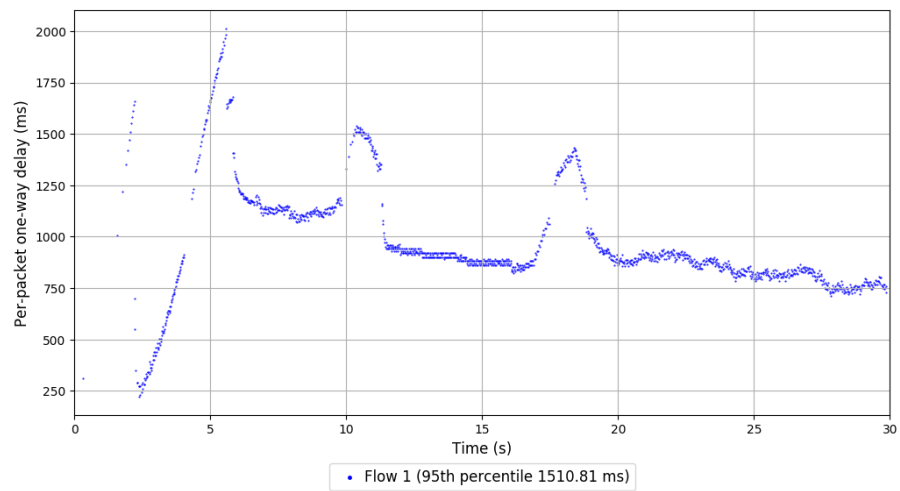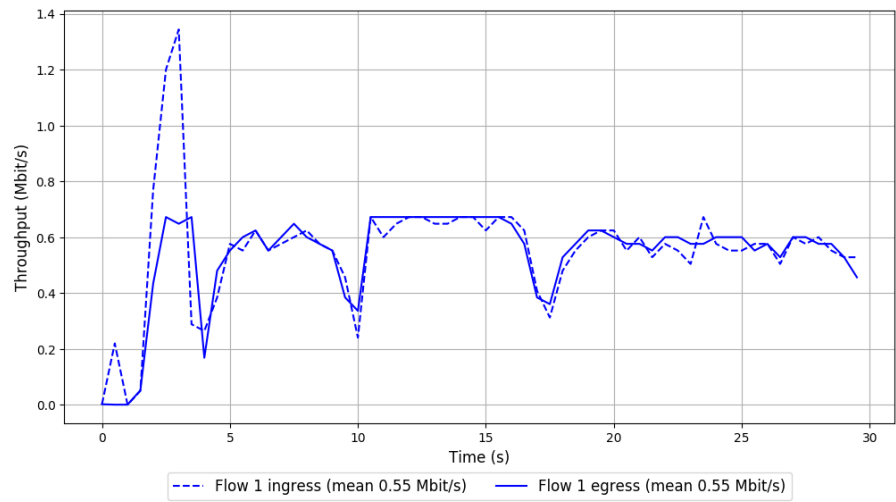
Run 2: Report of TCP Vegas — Data Link

```
Run 3: Statistics of TCP Vegas

Start at: 2017-08-10 18:23:15
End at: 2017-08-10 18:23:45
Local clock offset: 0.762 ms
Remote clock offset: 2.747 ms


# Below is generated by plot.py at 2017-08-10 19:21:07
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 942.146 ms
Loss rate: 1.13%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 942.146 ms
Loss rate: 1.13%
```
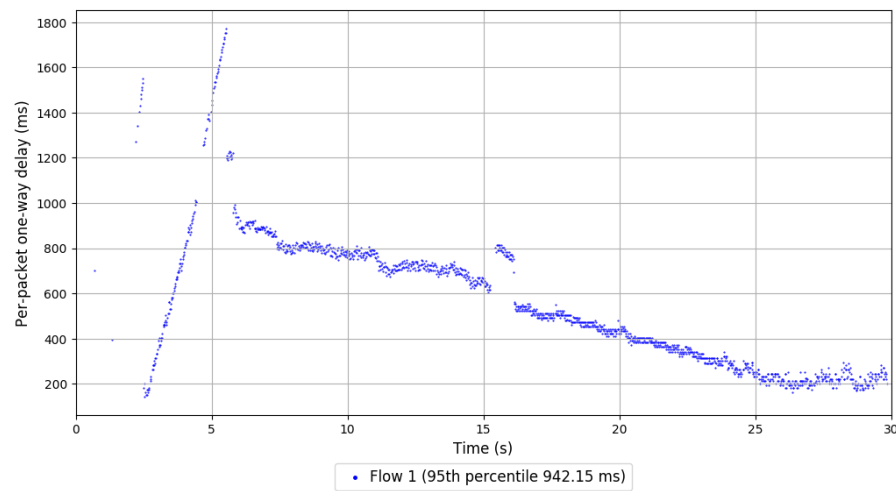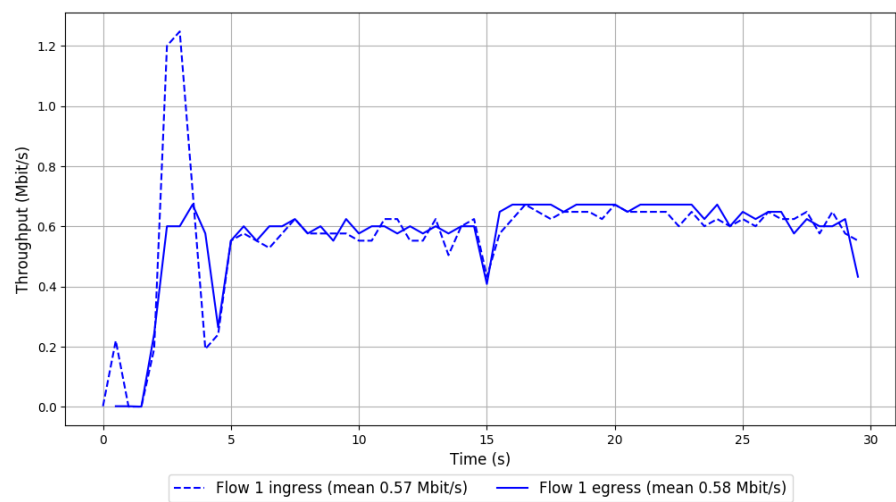
Run 3: Report of TCP Vegas — Data Link

Flow 1 ingress (mean 0.57 Mbit/s)   Flow 1 egress (mean 0.58 Mbit/s)

Flow 1 (95th percentile 942.15 ms)

```
Run 1: Statistics of Verus

Start at: 2017-08-10 17:39:50
End at: 2017-08-10 17:40:20
Local clock offset: 0.241 ms
Remote clock offset: 1.246 ms


# Below is generated by plot.py at 2017-08-10 19:21:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 2002.092 ms
Loss rate: 6.57%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 2002.092 ms
Loss rate: 6.57%
```
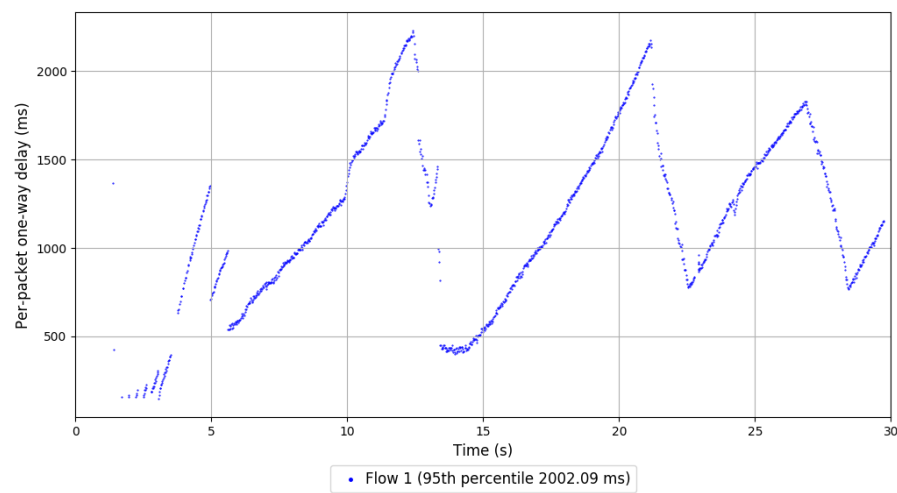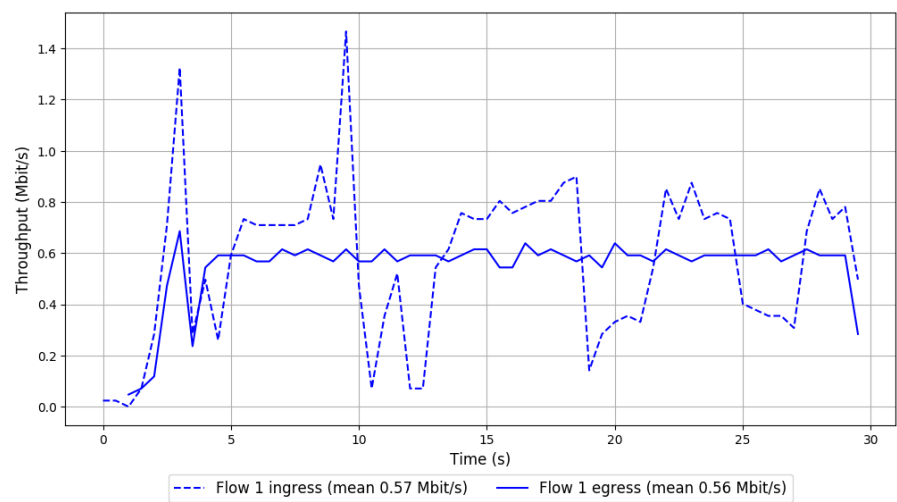
Run 1: Report of Verus — Data Link

Flow 1 ingress (mean 0.57 Mbit/s)   Flow 1 egress (mean 0.56 Mbit/s)

Flow 1 (95th percentile 2002.09 ms)

```
Run 2: Statistics of Verus

Start at: 2017-08-10 17:57:25
End at: 2017-08-10 17:57:55
Local clock offset: 0.508 ms
Remote clock offset: 2.059 ms


# Below is generated by plot.py at 2017-08-10 19:21:08
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 1868.086 ms
Loss rate: 5.30%
-- Flow 1:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 1868.086 ms
Loss rate: 5.30%
```
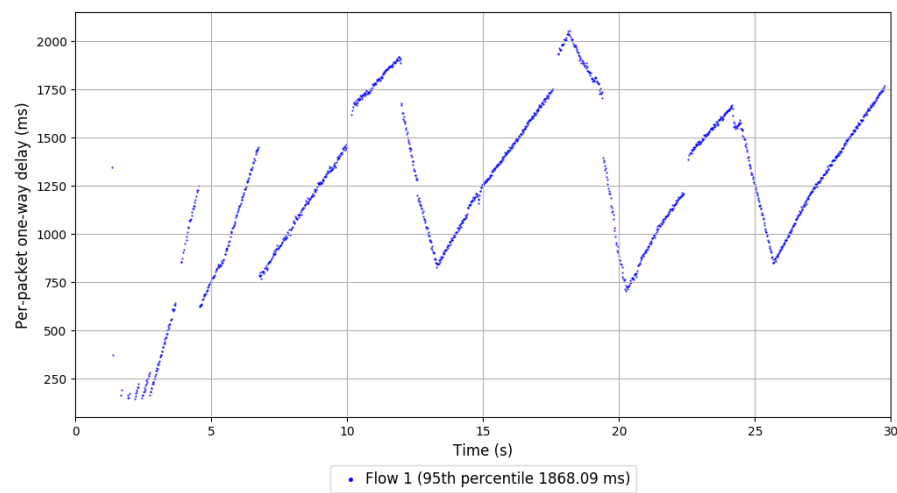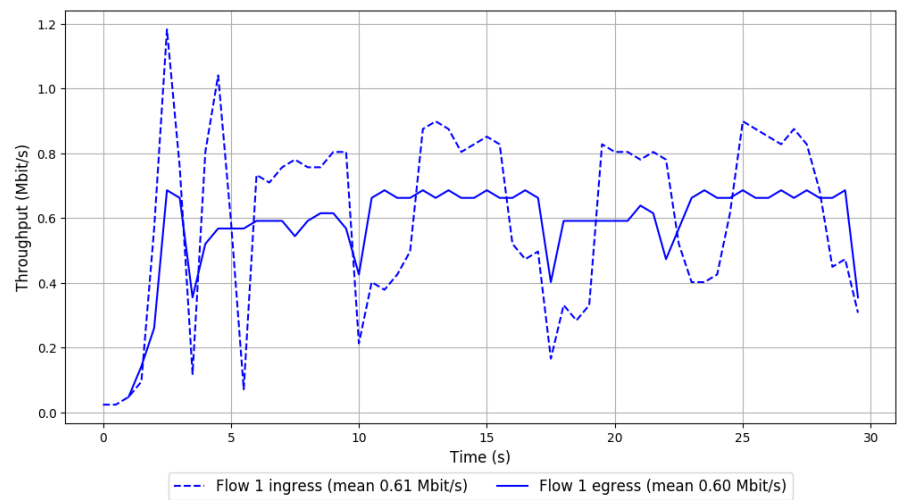
Run 2: Report of Verus — Data Link

Flow 1 ingress (mean 0.61 Mbit/s)   Flow 1 egress (mean 0.60 Mbit/s)

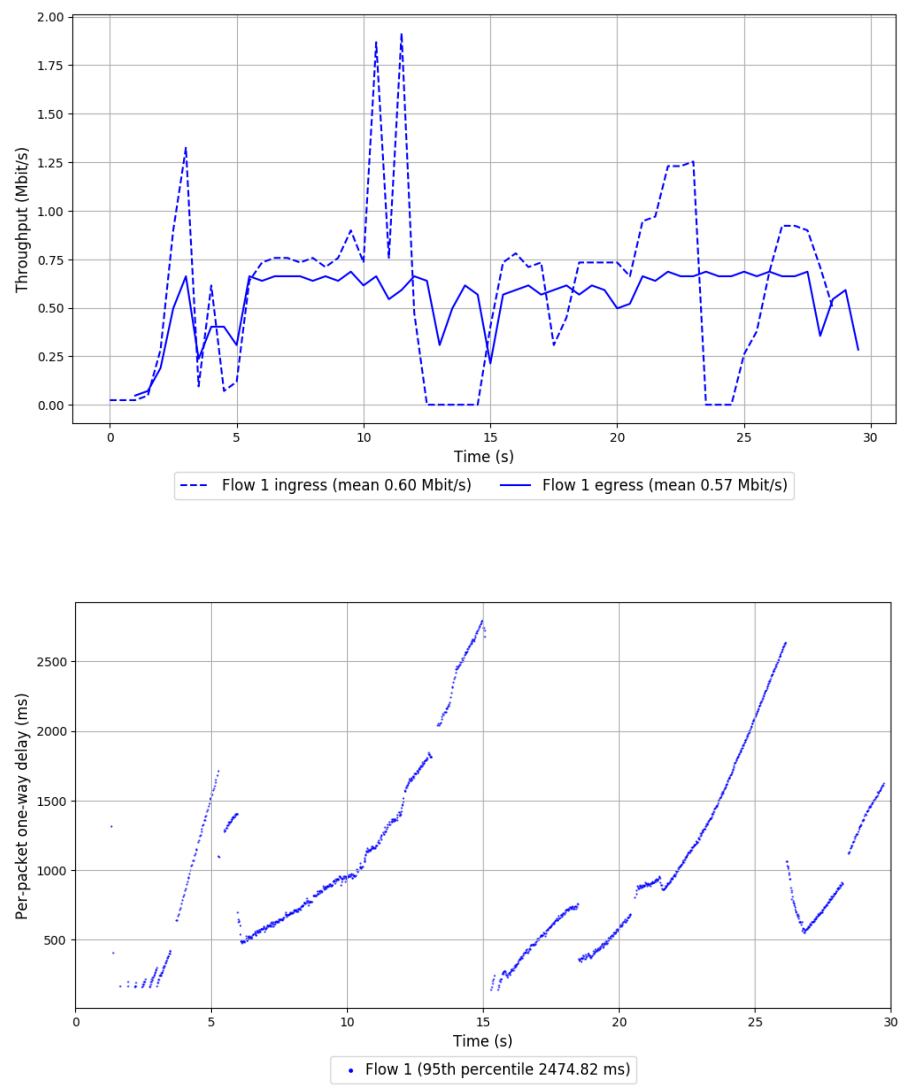

Flow 1 (95th percentile 1868.09 ms)

```
Run 3: Statistics of Verus

Start at: 2017-08-10 18:15:02
End at: 2017-08-10 18:15:32
Local clock offset: 0.726 ms
Remote clock offset: -3.209 ms


# Below is generated by plot.py at 2017-08-10 19:21:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 2474.815 ms
Loss rate: 7.24%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 2474.815 ms
Loss rate: 7.24%
```

Run 3: Report of Verus — Data Link

```
Run 1: Statistics of WebRTC media

Start at: 2017-08-10 17:41:00
End at: 2017-08-10 17:41:30
Local clock offset: 0.337 ms
Remote clock offset: 1.707 ms


# Below is generated by plot.py at 2017-08-10 19:21:09
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 1516.664 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 1516.664 ms
Loss rate: 0.00%
```
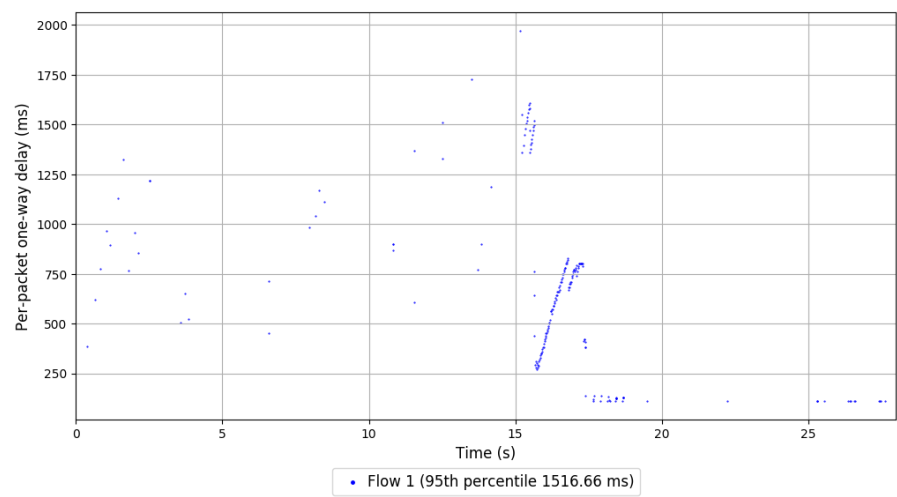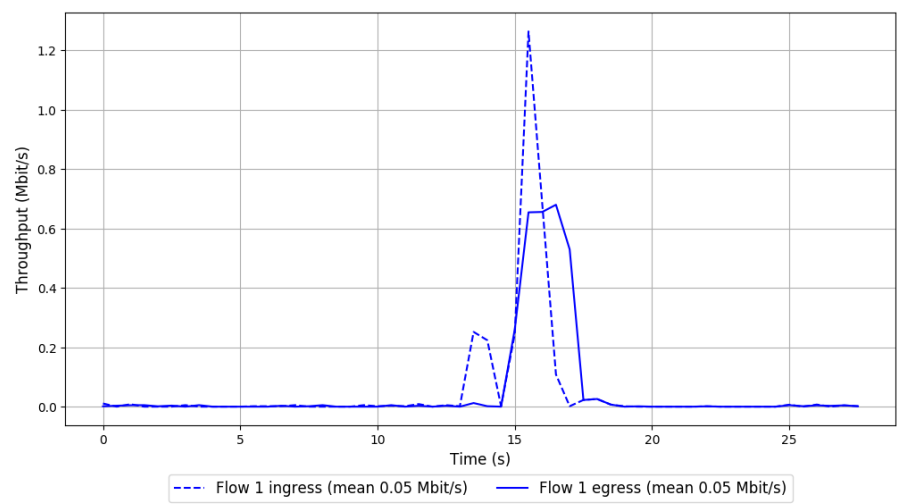
Run 1: Report of WebRTC media — Data Link

```
Run 2: Statistics of WebRTC media

Start at: 2017-08-10 17:58:37
End at: 2017-08-10 17:59:07
Local clock offset: 0.569 ms
Remote clock offset: 1.574 ms


# Below is generated by plot.py at 2017-08-10 19:21:10
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 494.544 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 494.544 ms
Loss rate: 0.70%
```
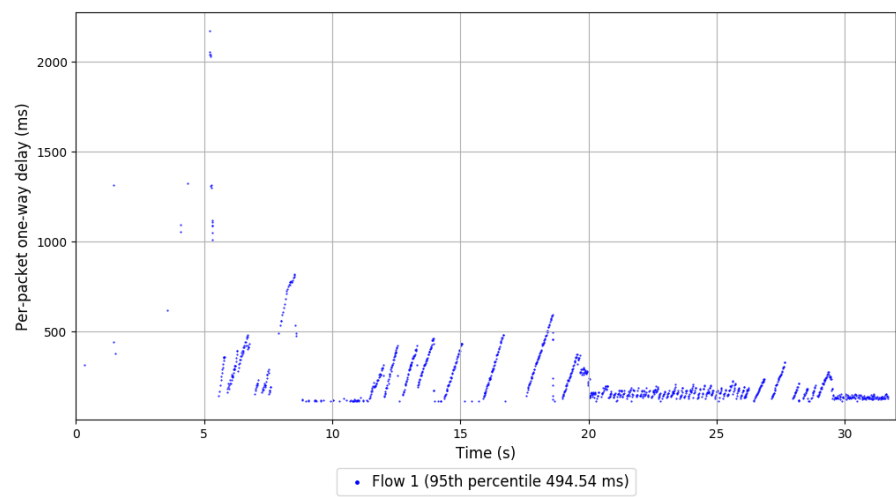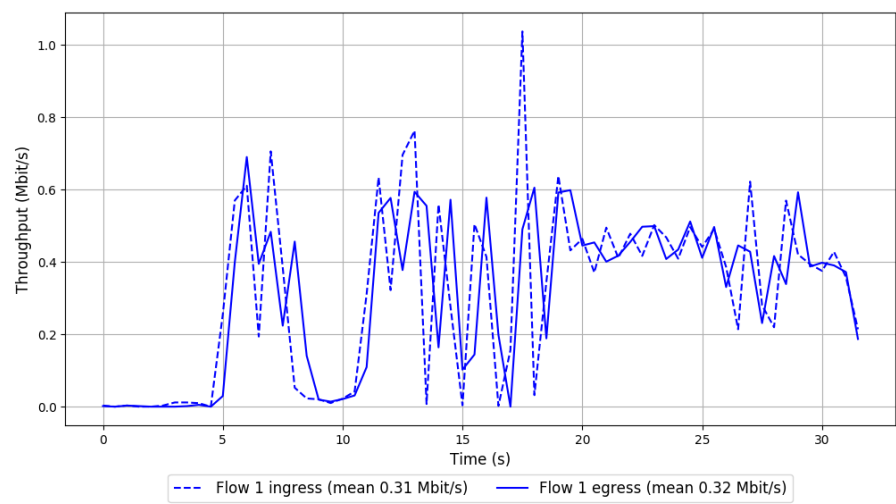
Run 2: Report of WebRTC media — Data Link

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

Flow 1 (95th percentile 494.54 ms) •

```
Run 3: Statistics of WebRTC media

Start at: 2017-08-10 18:16:13
End at: 2017-08-10 18:16:43
Local clock offset: 0.852 ms
Remote clock offset: 2.009 ms


# Below is generated by plot.py at 2017-08-10 19:21:10
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 590.921 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 590.921 ms
Loss rate: 0.91%
```

Run 3: Report of WebRTC media — Data Link

Flow 1 ingress (mean 0.29 Mbit/s) — — — Flow 1 egress (mean 0.29 Mbit/s)

Flow 1 (95th percentile 590.92 ms)