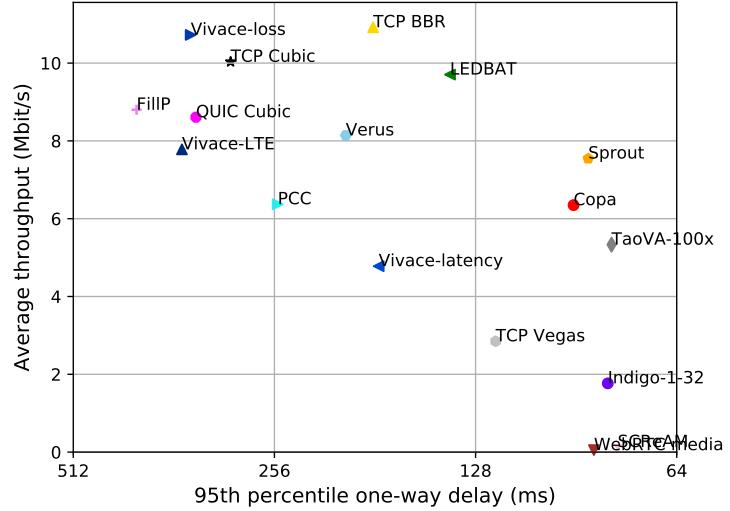


Pantheon Report

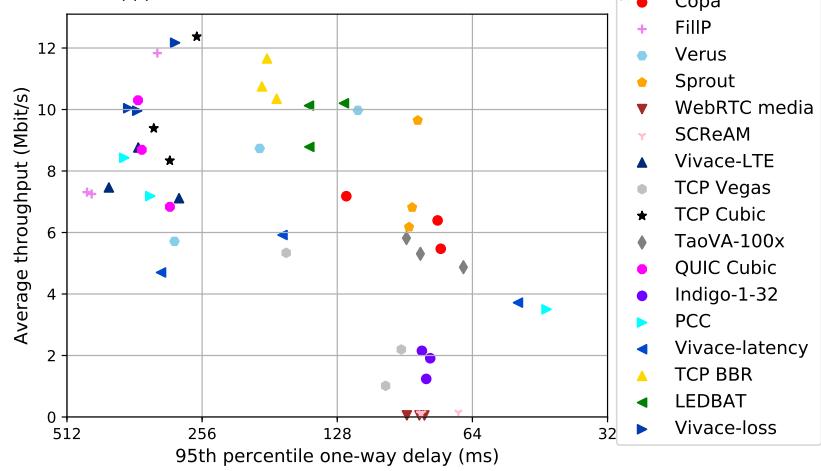
Generated at 2018-02-19 18:35:59 (UTC).
Data path: Stanford ppp0 (*remote*) → AWS California 1 Ethernet (*local*).
Repeated the test of 17 congestion control schemes 3 times.
Each test lasted for 30 seconds running 1 flow.
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).
NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

```
Git summary:  
branch: master @ f12c42a2c63fdd9a862eefa0468859bf379b6623  
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50  
  M datagrump/sender.cc  
third_party/fillp @ 828bbf95fd4941149b5cec90f281d1c69ae1a5c6  
third_party/genericCC @ 9249eea3238475c4d8cca1443d28df70bff6c4a2  
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9  
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d  
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d  
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f  
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89  
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681  
  M datagrump/sender.cc  
third_party/libutp @ b3465b942e2826f2b179aab4a906ce6bb7cf3cf  
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993  
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1  
  M receiver/src/buffer.h  
  M receiver/src/core.cpp  
  M sender/src/buffer.h  
  M sender/src/core.cpp  
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42  
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885  
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681  
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce  
  M src/examples/cellsim.cc  
  M src/examples/sproutbt2.cc  
  M src/network/sproutconn.cc  
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494  
  M src/verus.hpp  
  M tools/plot.py  
third_party/vivace @ 7a4ba531e75b4a6f66f5c4580192120401784ce3  
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



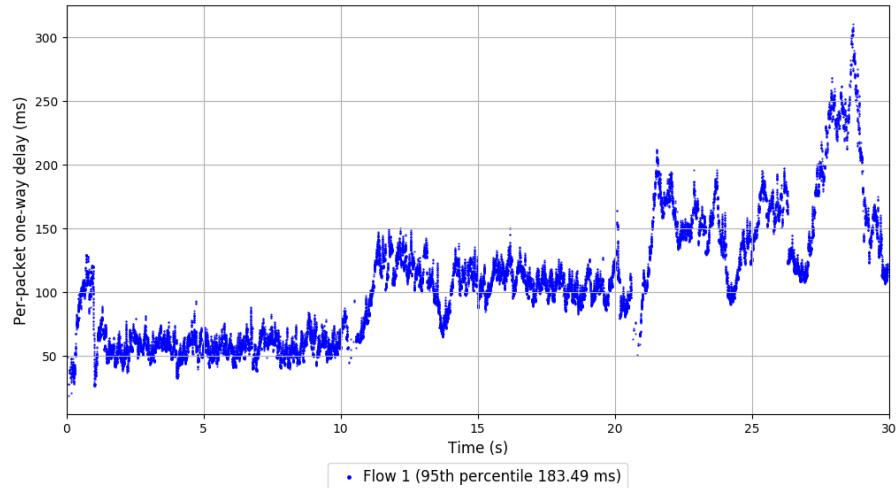
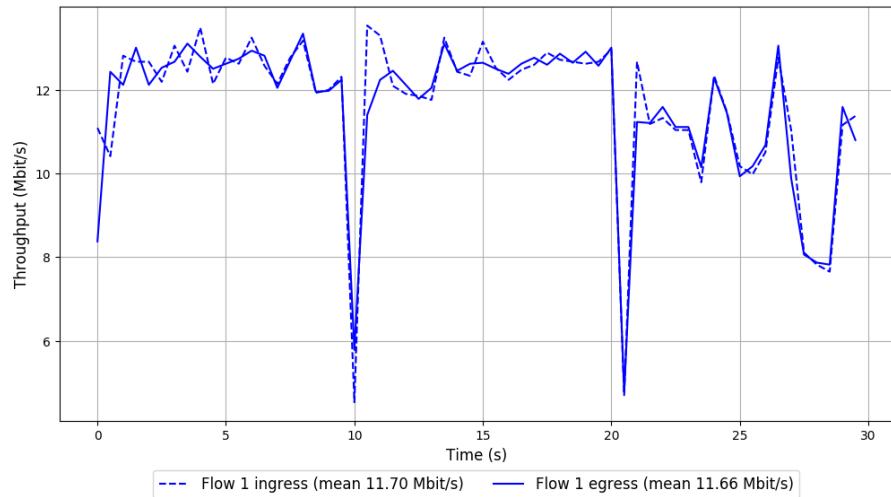
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	10.92	182.18	0.53
TCP Cubic	3	10.03	297.75	1.17
LEDBAT	3	9.70	139.81	0.45
PCC	3	6.37	253.09	1.51
QUIC Cubic	3	8.61	335.50	2.12
SCReAM	3	0.13	78.46	0.16
WebRTC media	3	0.05	85.14	0.00
Sprout	3	7.55	86.82	1.03
TaoVA-100x	3	5.33	80.11	0.29
TCP Vegas	3	2.85	119.46	0.17
Verus	3	8.14	200.22	2.52
Copa	3	6.35	91.33	0.21
FillP	3	8.80	411.71	55.65
Indigo-1-32	3	1.77	81.16	0.62
Vivace-latency	3	4.78	178.75	0.80
Vivace-loss	3	10.72	341.62	19.18
Vivace-LTE	3	7.79	352.10	6.40

Run 1: Statistics of TCP BBR

```
Start at: 2018-02-19 16:17:18
End at: 2018-02-19 16:17:48
Local clock offset: 2.152 ms
Remote clock offset: -6.558 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.66 Mbit/s
95th percentile per-packet one-way delay: 183.494 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 11.66 Mbit/s
95th percentile per-packet one-way delay: 183.494 ms
Loss rate: 0.55%
```

Run 1: Report of TCP BBR — Data Link

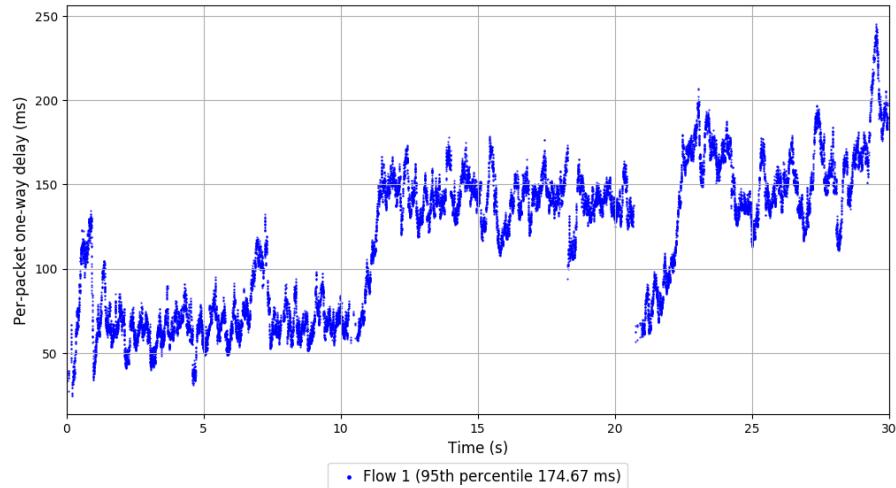
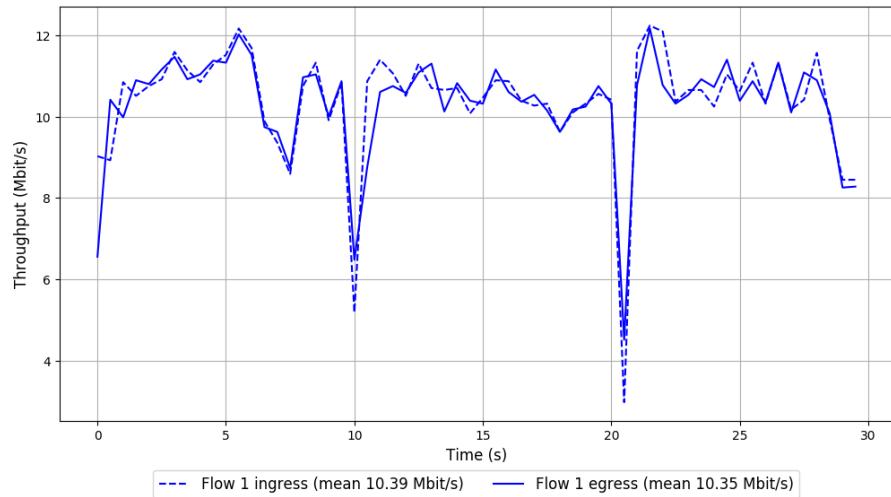


Run 2: Statistics of TCP BBR

```
Start at: 2018-02-19 16:40:53
End at: 2018-02-19 16:41:23
Local clock offset: 2.336 ms
Remote clock offset: -4.945 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.35 Mbit/s
95th percentile per-packet one-way delay: 174.673 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 10.35 Mbit/s
95th percentile per-packet one-way delay: 174.673 ms
Loss rate: 0.59%
```

Run 2: Report of TCP BBR — Data Link

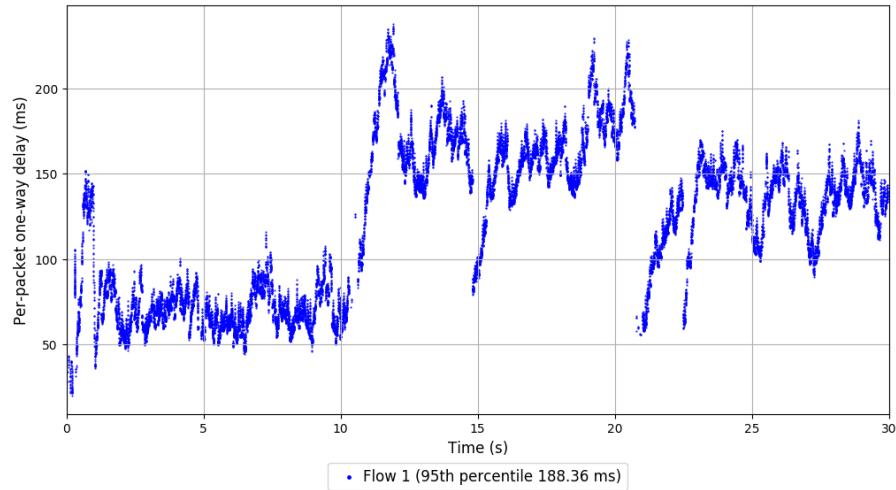
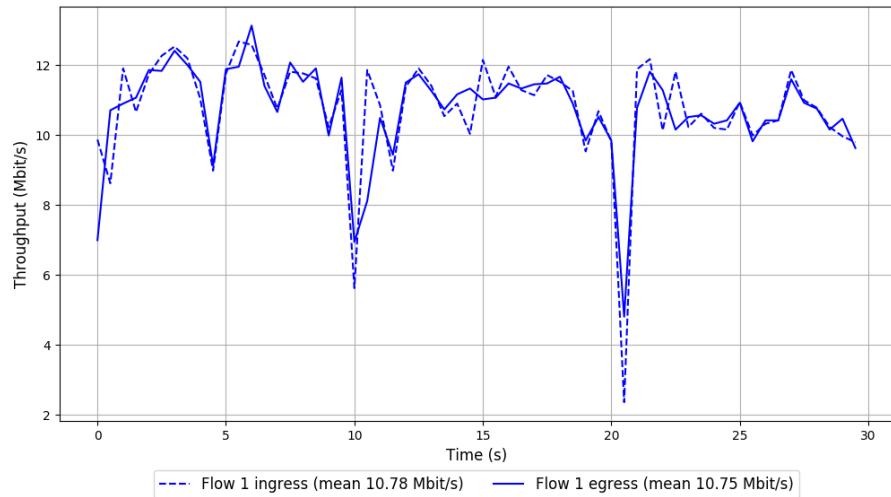


Run 3: Statistics of TCP BBR

```
Start at: 2018-02-19 17:04:27
End at: 2018-02-19 17:04:57
Local clock offset: 1.717 ms
Remote clock offset: -4.853 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.75 Mbit/s
95th percentile per-packet one-way delay: 188.358 ms
Loss rate: 0.44%
-- Flow 1:
Average throughput: 10.75 Mbit/s
95th percentile per-packet one-way delay: 188.358 ms
Loss rate: 0.44%
```

Run 3: Report of TCP BBR — Data Link

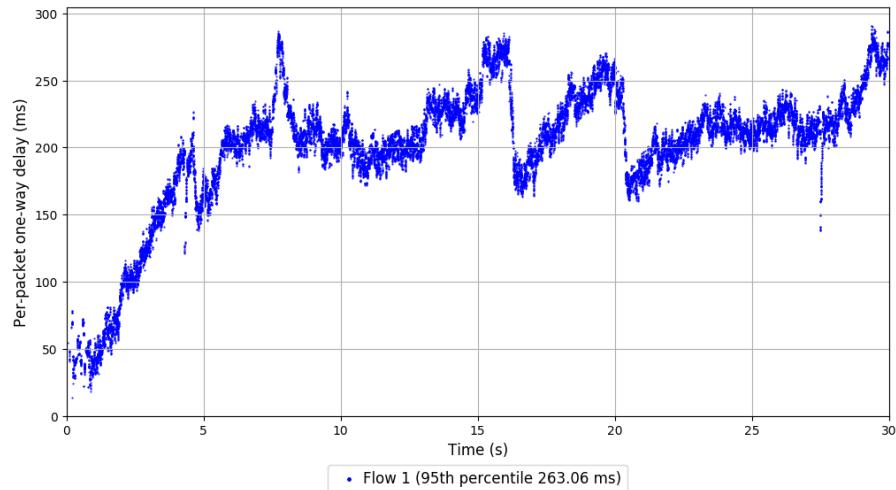
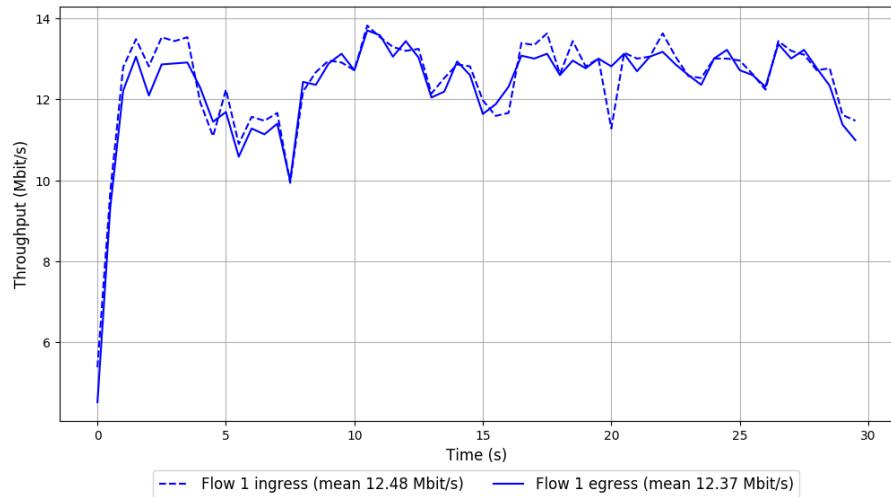


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-02-19 16:13:22
End at: 2018-02-19 16:13:52
Local clock offset: 2.177 ms
Remote clock offset: -6.589 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.37 Mbit/s
95th percentile per-packet one-way delay: 263.061 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 12.37 Mbit/s
95th percentile per-packet one-way delay: 263.061 ms
Loss rate: 1.14%
```

Run 1: Report of TCP Cubic — Data Link

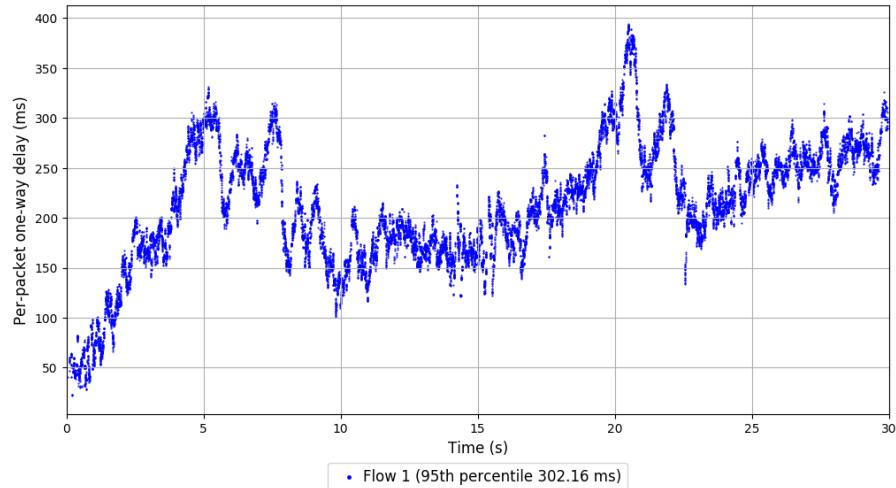
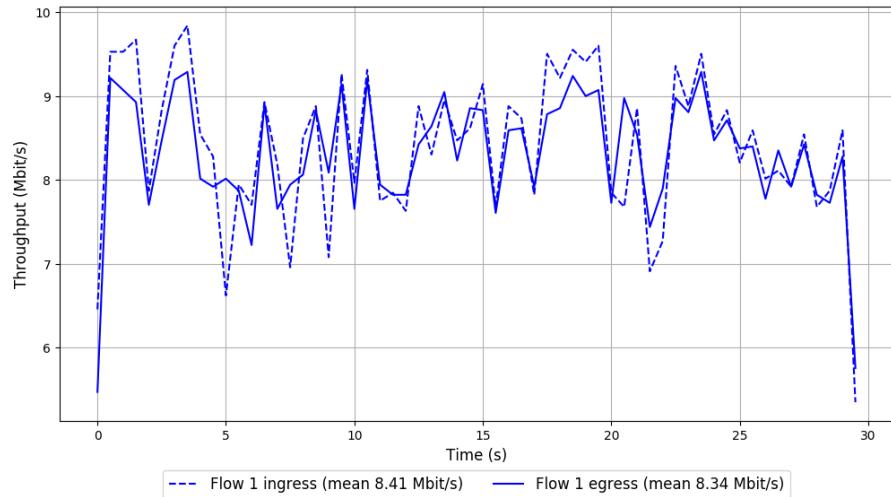


Run 2: Statistics of TCP Cubic

```
Start at: 2018-02-19 16:36:57
End at: 2018-02-19 16:37:27
Local clock offset: 2.365 ms
Remote clock offset: -5.201 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.34 Mbit/s
95th percentile per-packet one-way delay: 302.158 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 8.34 Mbit/s
95th percentile per-packet one-way delay: 302.158 ms
Loss rate: 1.03%
```

Run 2: Report of TCP Cubic — Data Link

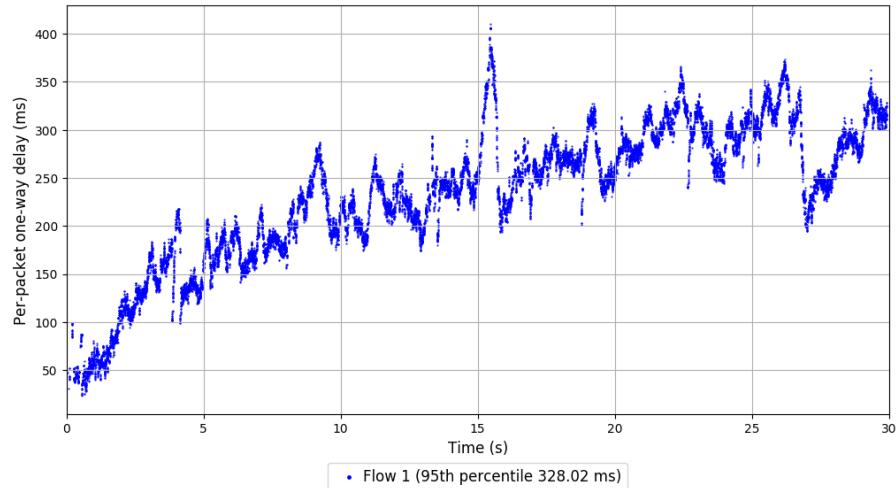
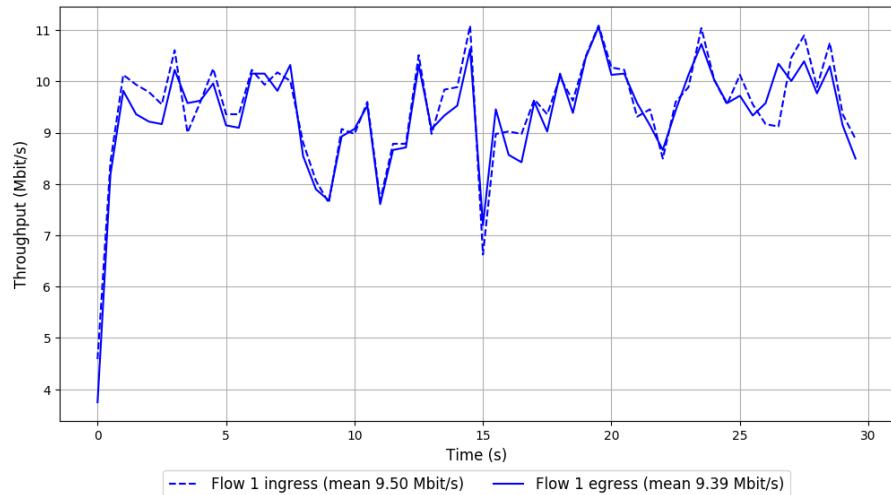


Run 3: Statistics of TCP Cubic

```
Start at: 2018-02-19 17:00:31
End at: 2018-02-19 17:01:01
Local clock offset: 1.67 ms
Remote clock offset: -4.192 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.39 Mbit/s
95th percentile per-packet one-way delay: 328.016 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 9.39 Mbit/s
95th percentile per-packet one-way delay: 328.016 ms
Loss rate: 1.33%
```

Run 3: Report of TCP Cubic — Data Link

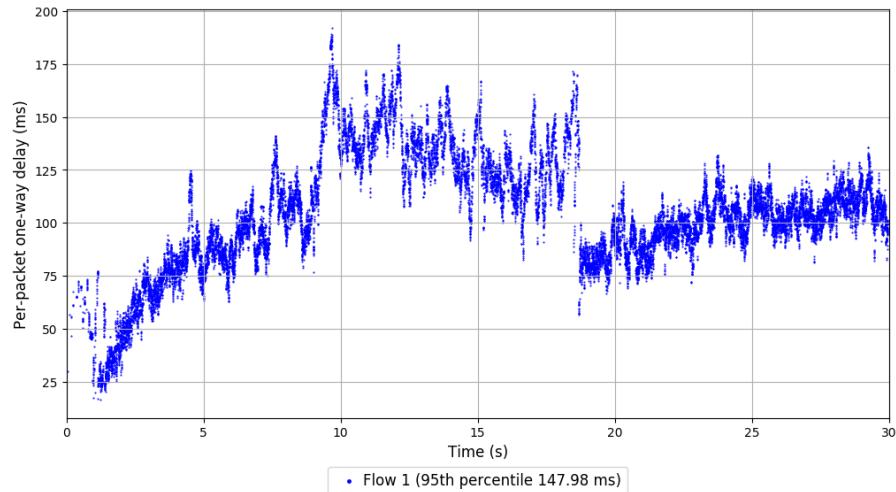
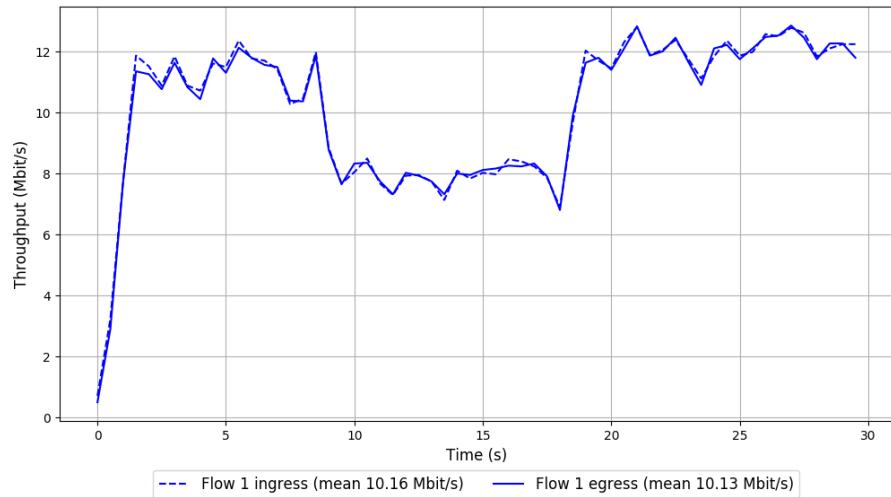


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-02-19 16:30:24
End at: 2018-02-19 16:30:54
Local clock offset: 2.307 ms
Remote clock offset: -5.796 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.13 Mbit/s
95th percentile per-packet one-way delay: 147.982 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 10.13 Mbit/s
95th percentile per-packet one-way delay: 147.982 ms
Loss rate: 0.50%
```

Run 1: Report of LEDBAT — Data Link

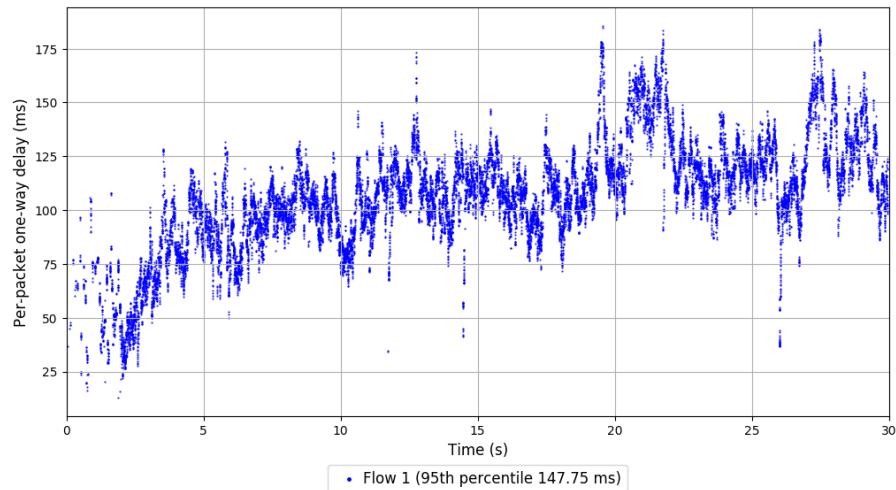
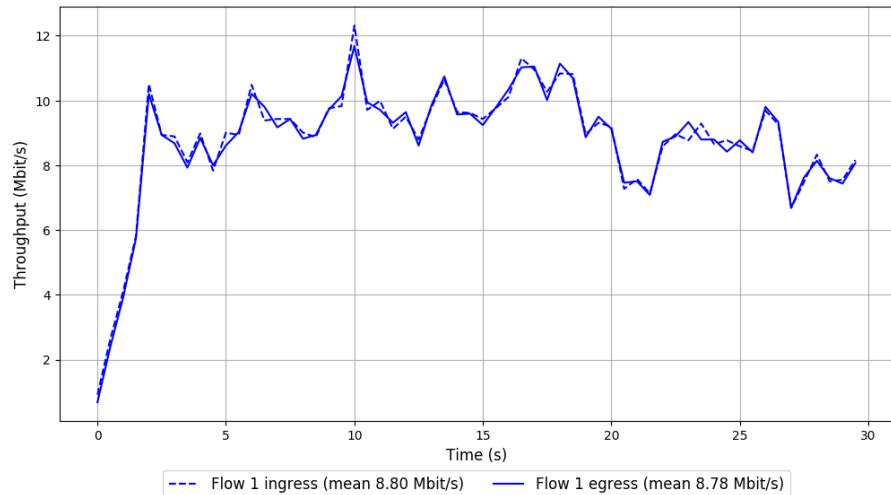


Run 2: Statistics of LEDBAT

```
Start at: 2018-02-19 16:53:58
End at: 2018-02-19 16:54:28
Local clock offset: 1.77 ms
Remote clock offset: -4.022 ms

# Below is generated by plot.py at 2018-02-19 18:35:01
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.78 Mbit/s
95th percentile per-packet one-way delay: 147.750 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 8.78 Mbit/s
95th percentile per-packet one-way delay: 147.750 ms
Loss rate: 0.40%
```

Run 2: Report of LEDBAT — Data Link

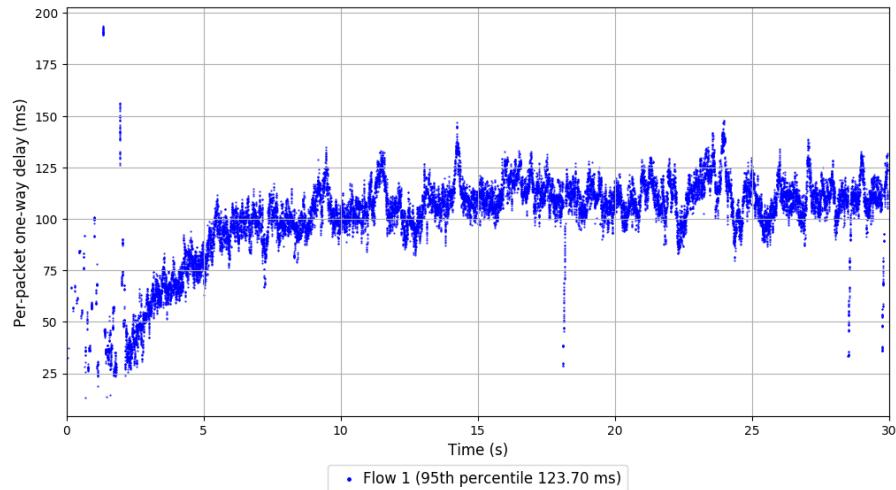
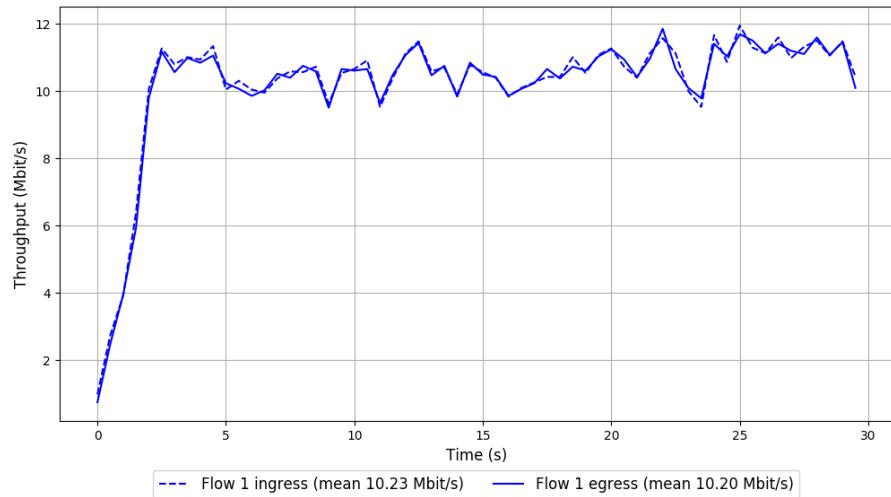


```
Run 3: Statistics of LEDBAT
```

```
Start at: 2018-02-19 17:17:33
End at: 2018-02-19 17:18:03
Local clock offset: 1.368 ms
Remote clock offset: -5.429 ms

# Below is generated by plot.py at 2018-02-19 18:35:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.20 Mbit/s
95th percentile per-packet one-way delay: 123.704 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 10.20 Mbit/s
95th percentile per-packet one-way delay: 123.704 ms
Loss rate: 0.46%
```

Run 3: Report of LEDBAT — Data Link

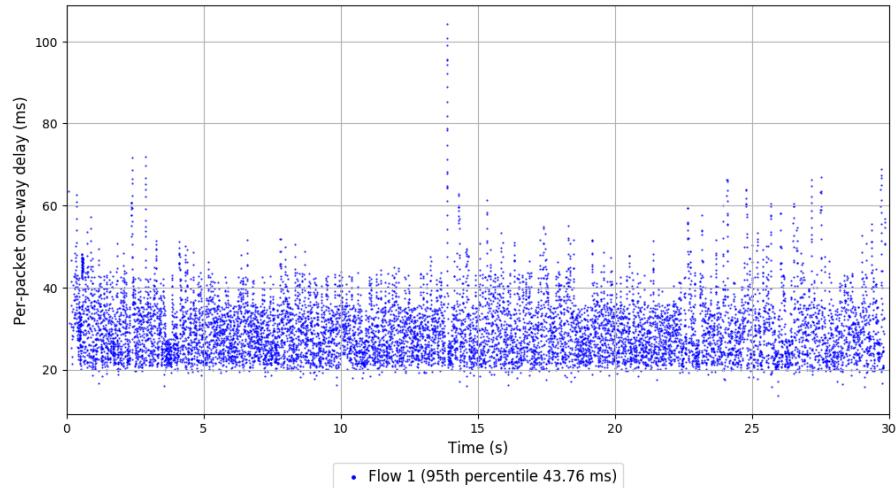
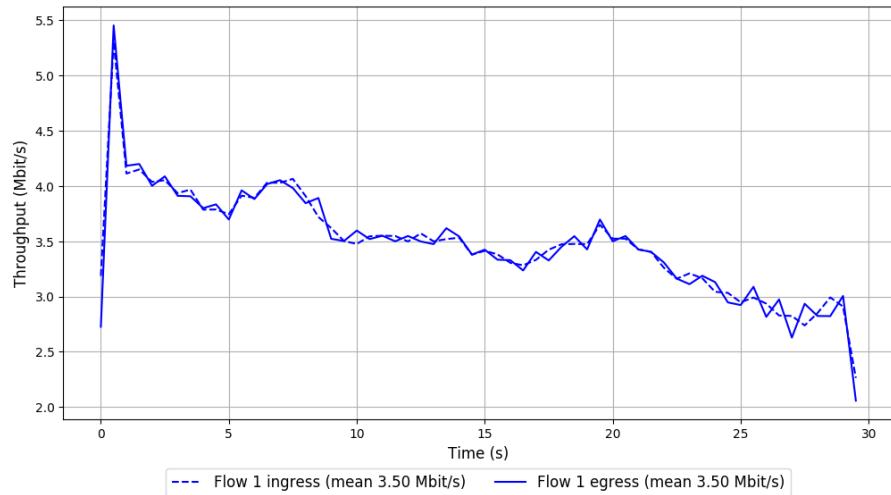


Run 1: Statistics of PCC

```
Start at: 2018-02-19 16:21:14
End at: 2018-02-19 16:21:44
Local clock offset: 2.229 ms
Remote clock offset: -6.616 ms

# Below is generated by plot.py at 2018-02-19 18:35:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.50 Mbit/s
95th percentile per-packet one-way delay: 43.755 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 3.50 Mbit/s
95th percentile per-packet one-way delay: 43.755 ms
Loss rate: 0.22%
```

Run 1: Report of PCC — Data Link

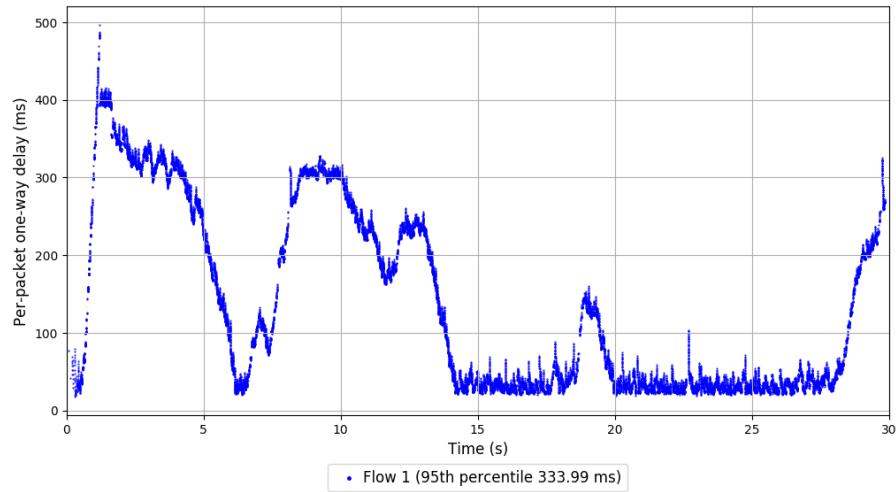
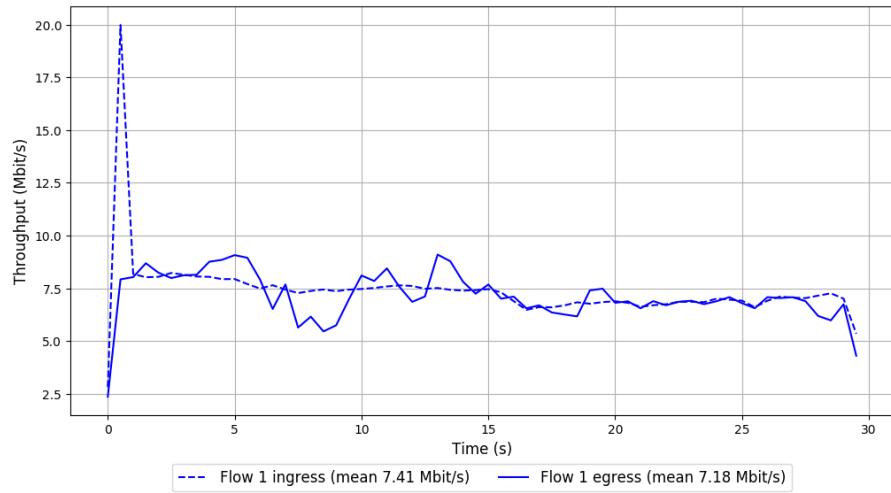


Run 2: Statistics of PCC

```
Start at: 2018-02-19 16:44:49
End at: 2018-02-19 16:45:19
Local clock offset: 2.228 ms
Remote clock offset: -4.596 ms

# Below is generated by plot.py at 2018-02-19 18:35:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.18 Mbit/s
95th percentile per-packet one-way delay: 333.992 ms
Loss rate: 3.40%
-- Flow 1:
Average throughput: 7.18 Mbit/s
95th percentile per-packet one-way delay: 333.992 ms
Loss rate: 3.40%
```

Run 2: Report of PCC — Data Link

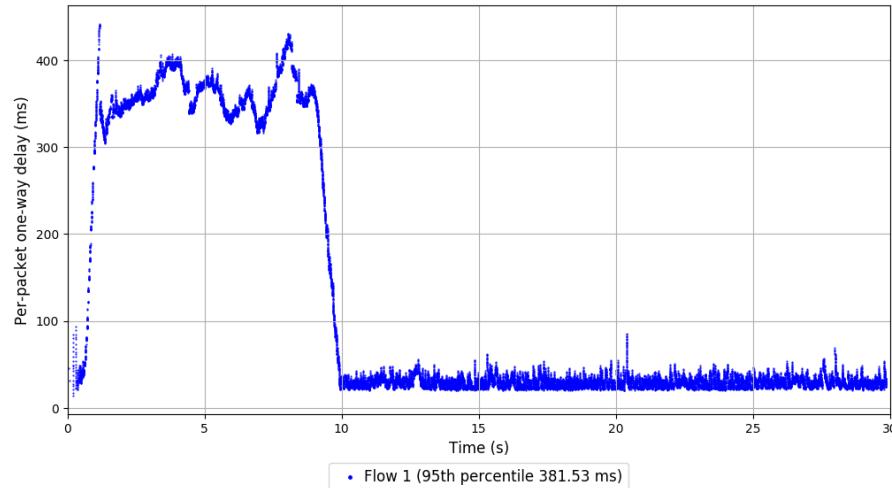
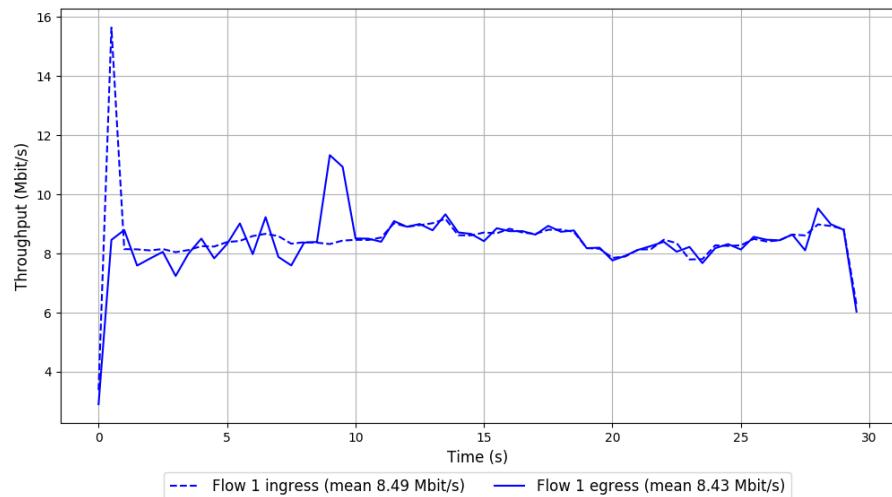


Run 3: Statistics of PCC

```
Start at: 2018-02-19 17:08:23
End at: 2018-02-19 17:08:53
Local clock offset: 1.729 ms
Remote clock offset: -5.15 ms

# Below is generated by plot.py at 2018-02-19 18:35:14
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.43 Mbit/s
95th percentile per-packet one-way delay: 381.529 ms
Loss rate: 0.91%
-- Flow 1:
Average throughput: 8.43 Mbit/s
95th percentile per-packet one-way delay: 381.529 ms
Loss rate: 0.91%
```

Run 3: Report of PCC — Data Link

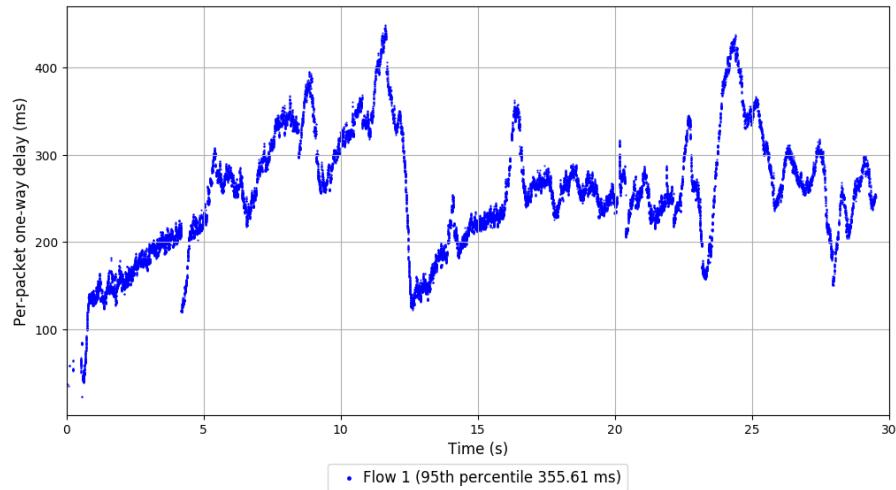
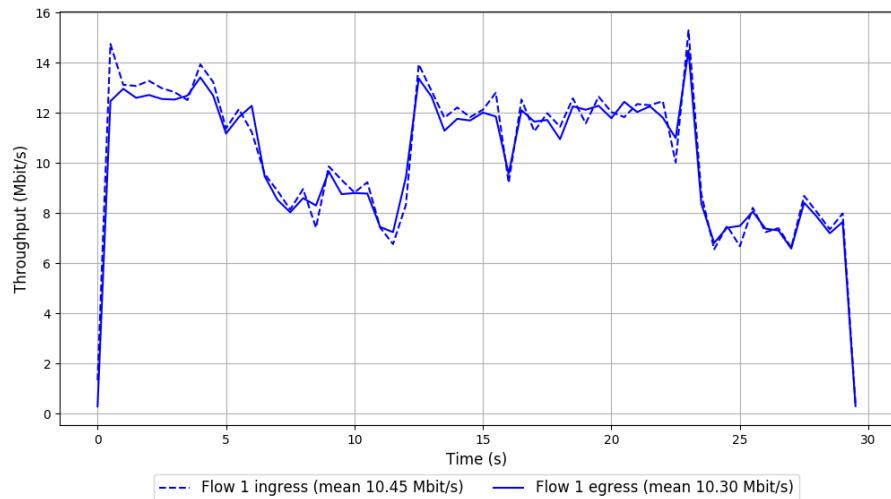


```
Run 1: Statistics of QUIC Cubic

Start at: 2018-02-19 16:22:33
End at: 2018-02-19 16:23:03
Local clock offset: 2.121 ms
Remote clock offset: -6.562 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.30 Mbit/s
95th percentile per-packet one-way delay: 355.613 ms
Loss rate: 1.60%
-- Flow 1:
Average throughput: 10.30 Mbit/s
95th percentile per-packet one-way delay: 355.613 ms
Loss rate: 1.60%
```

Run 1: Report of QUIC Cubic — Data Link

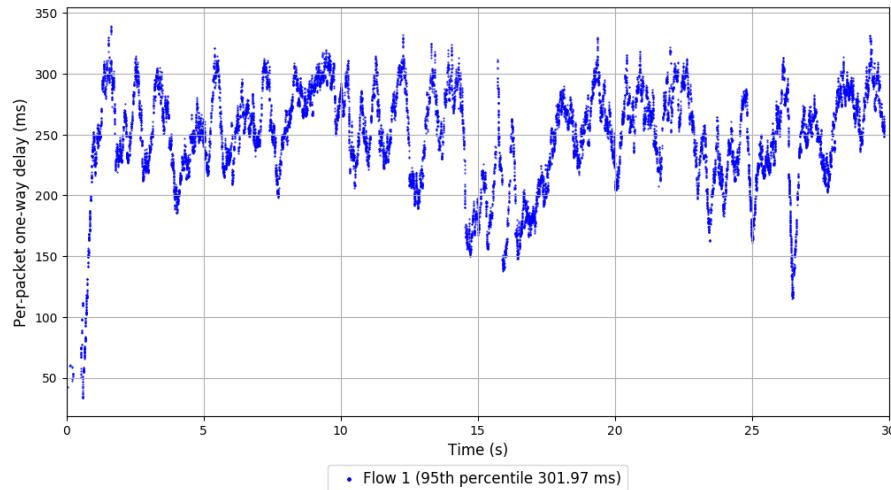
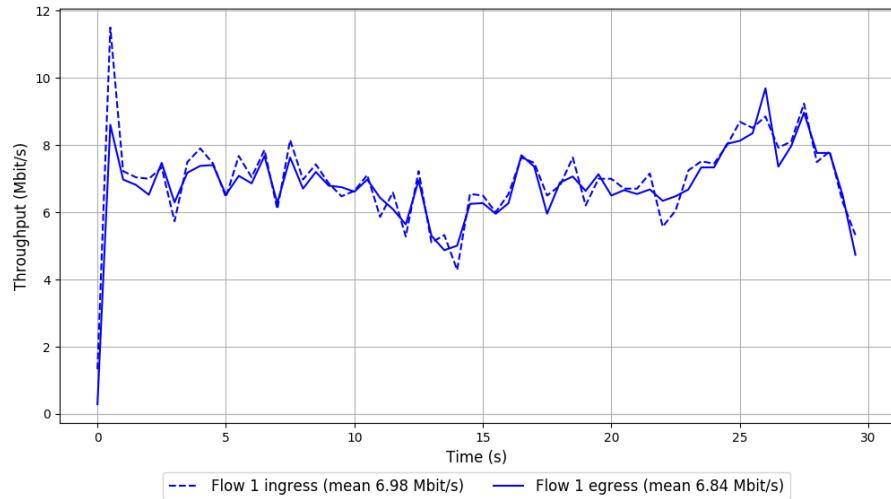


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-02-19 16:46:07
End at: 2018-02-19 16:46:37
Local clock offset: 2.138 ms
Remote clock offset: -4.607 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.84 Mbit/s
95th percentile per-packet one-way delay: 301.971 ms
Loss rate: 2.22%
-- Flow 1:
Average throughput: 6.84 Mbit/s
95th percentile per-packet one-way delay: 301.971 ms
Loss rate: 2.22%
```

Run 2: Report of QUIC Cubic — Data Link

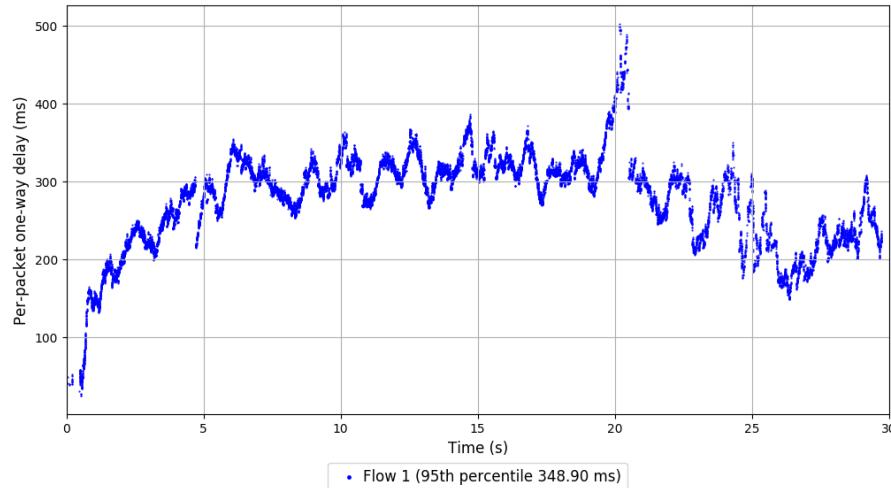
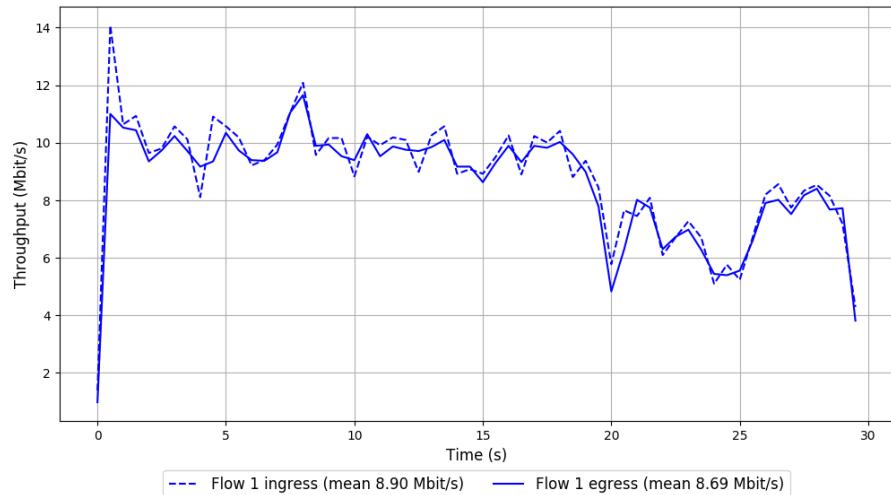


Run 3: Statistics of QUIC Cubic

```
Start at: 2018-02-19 17:09:41
End at: 2018-02-19 17:10:11
Local clock offset: 1.696 ms
Remote clock offset: -5.281 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.69 Mbit/s
95th percentile per-packet one-way delay: 348.905 ms
Loss rate: 2.53%
-- Flow 1:
Average throughput: 8.69 Mbit/s
95th percentile per-packet one-way delay: 348.905 ms
Loss rate: 2.53%
```

Run 3: Report of QUIC Cubic — Data Link

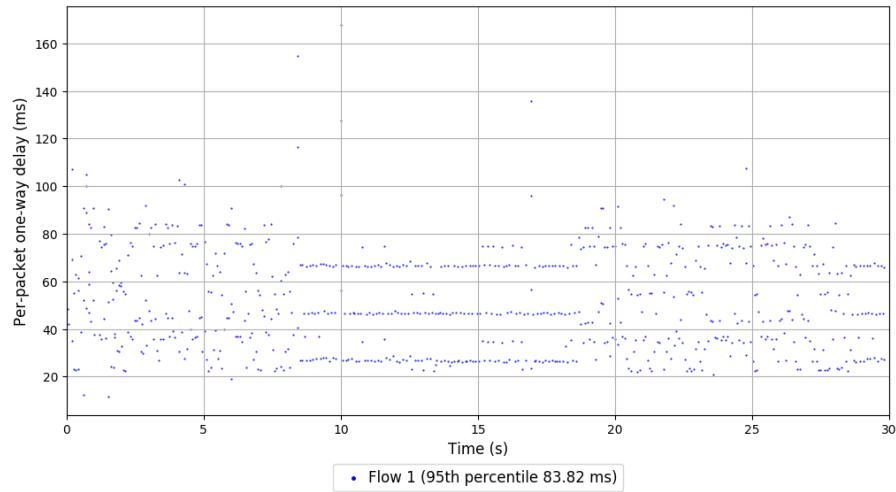
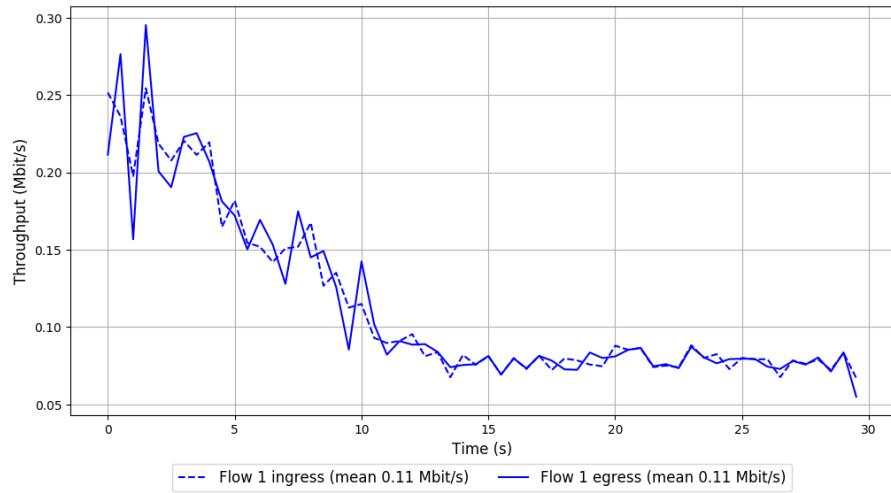


```
Run 1: Statistics of SCReAM

Start at: 2018-02-19 16:26:29
End at: 2018-02-19 16:26:59
Local clock offset: 2.161 ms
Remote clock offset: -6.289 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 83.820 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 83.820 ms
Loss rate: 0.26%
```

Run 1: Report of SCReAM — Data Link

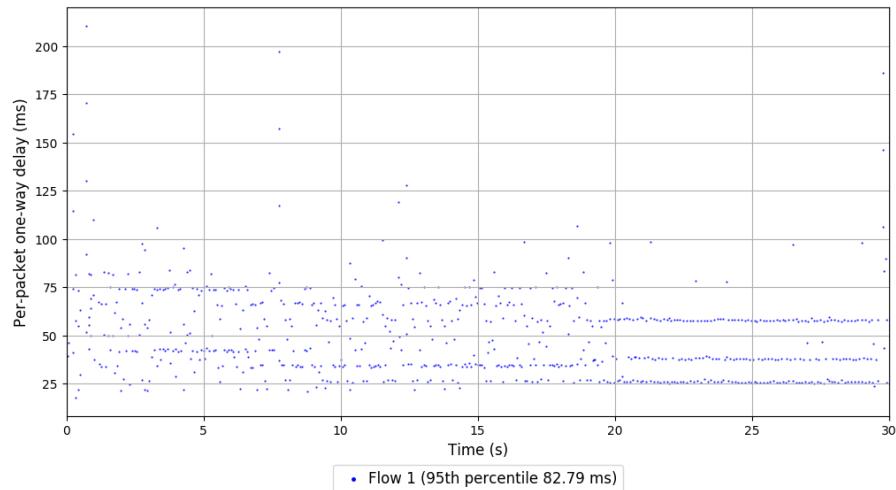
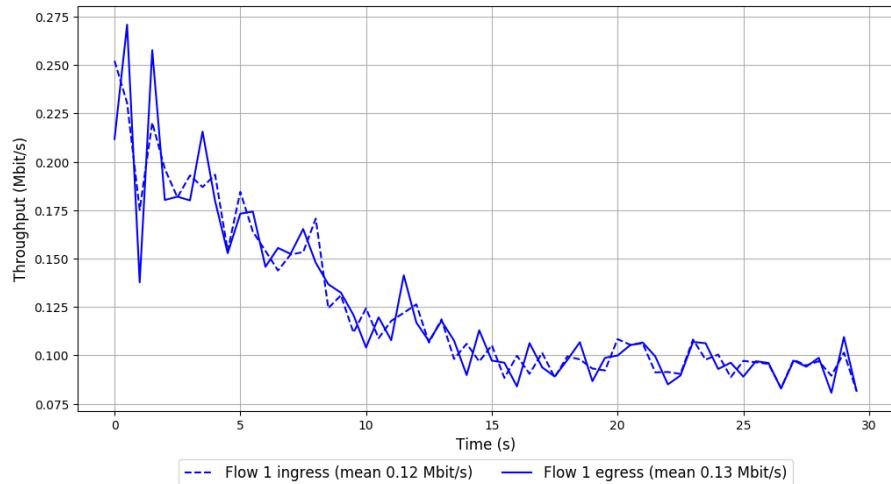


Run 2: Statistics of SCReAM

```
Start at: 2018-02-19 16:50:03
End at: 2018-02-19 16:50:33
Local clock offset: 1.888 ms
Remote clock offset: -4.361 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 82.786 ms
Loss rate: 0.10%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 82.786 ms
Loss rate: 0.10%
```

Run 2: Report of SCReAM — Data Link

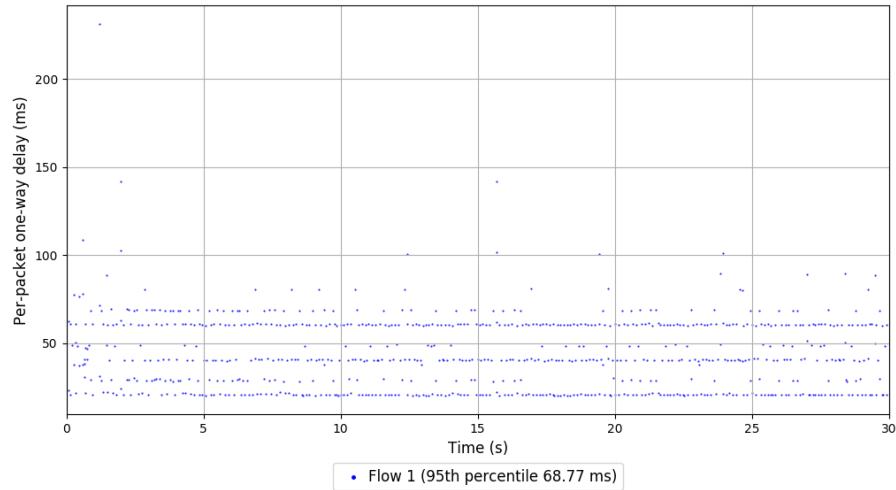
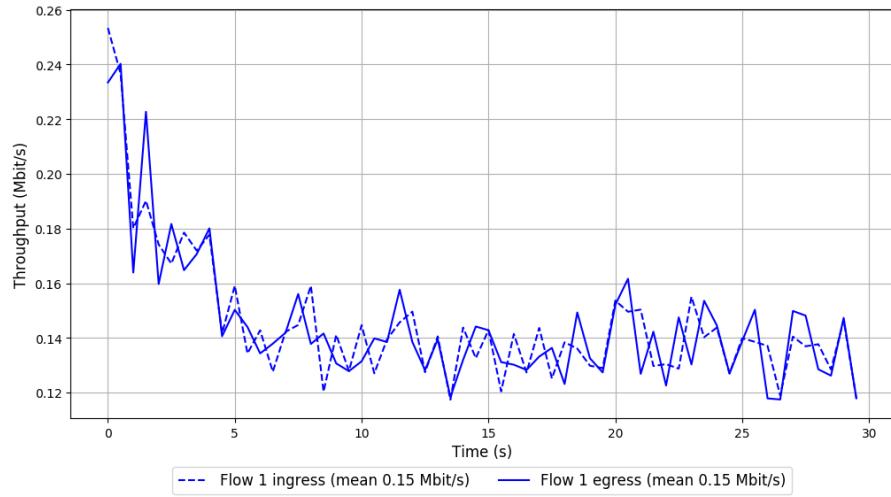


Run 3: Statistics of SCReAM

```
Start at: 2018-02-19 17:13:37
End at: 2018-02-19 17:14:07
Local clock offset: 1.665 ms
Remote clock offset: -5.451 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 68.772 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 68.772 ms
Loss rate: 0.12%
```

Run 3: Report of SCReAM — Data Link

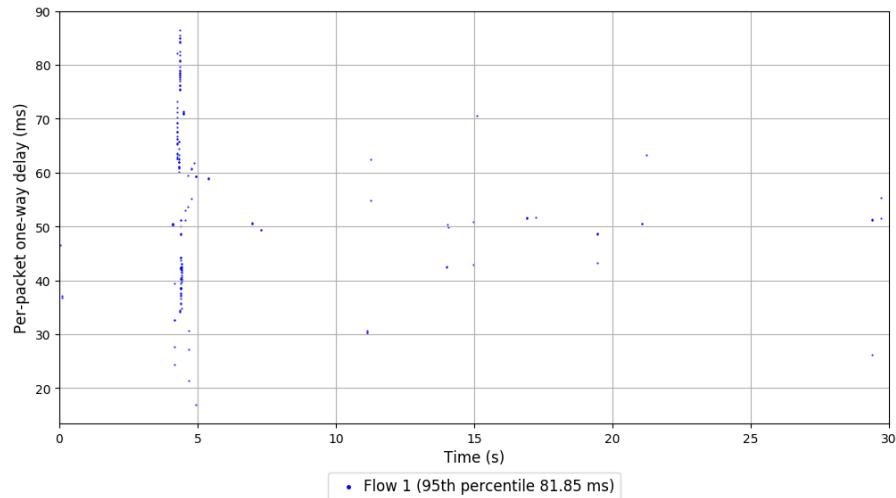
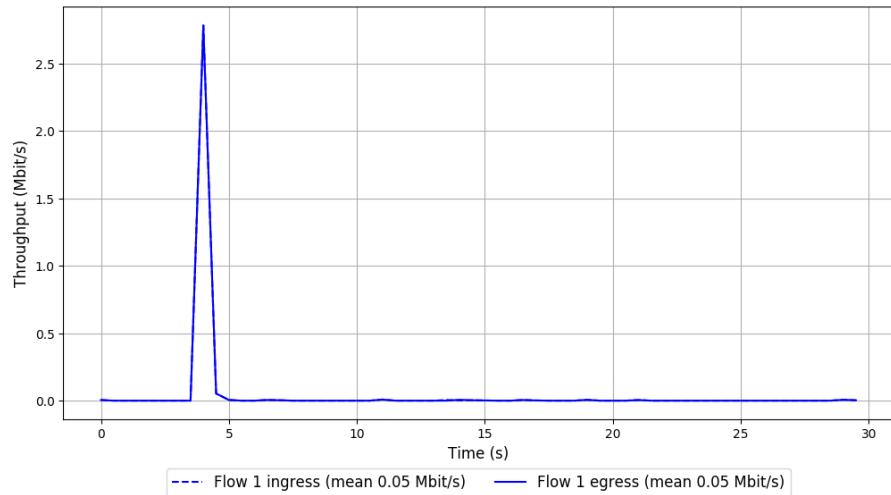


```
Run 1: Statistics of WebRTC media

Start at: 2018-02-19 16:18:37
End at: 2018-02-19 16:19:07
Local clock offset: 2.225 ms
Remote clock offset: -6.639 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 81.852 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 81.852 ms
Loss rate: 0.00%
```

Run 1: Report of WebRTC media — Data Link

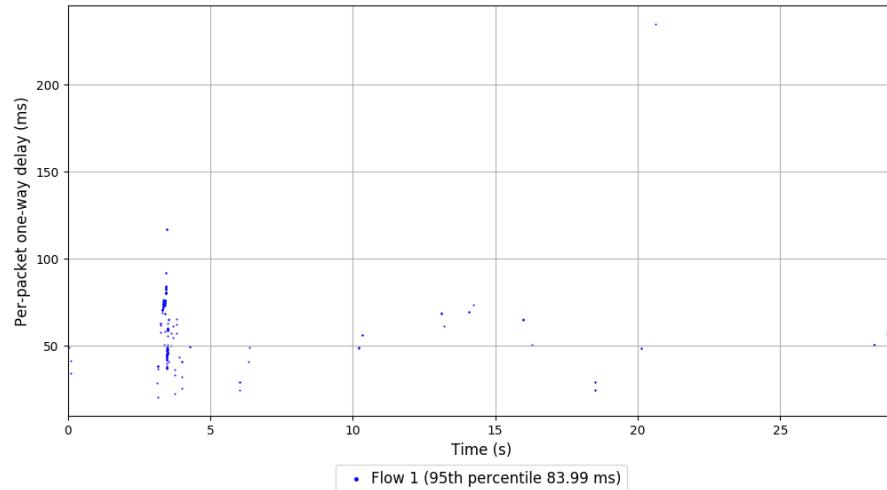
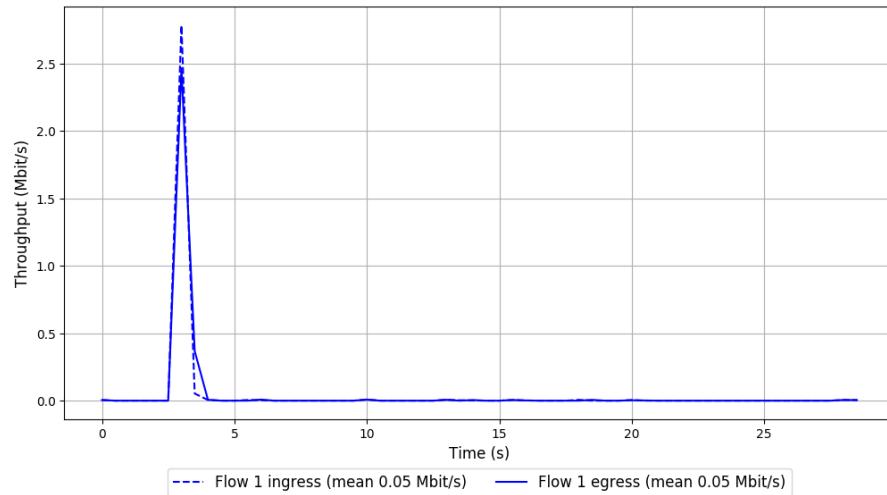


```
Run 2: Statistics of WebRTC media
```

```
Start at: 2018-02-19 16:42:12
End at: 2018-02-19 16:42:42
Local clock offset: 2.408 ms
Remote clock offset: -4.833 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 83.991 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 83.991 ms
Loss rate: 0.00%
```

Run 2: Report of WebRTC media — Data Link

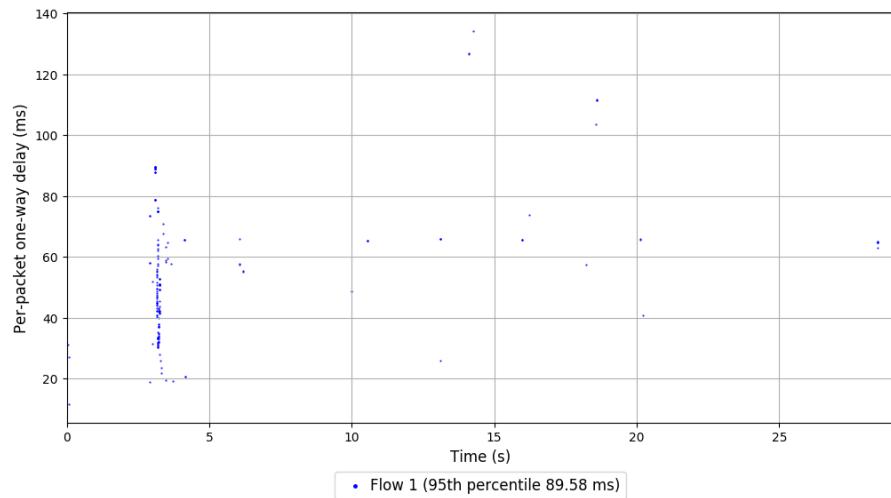
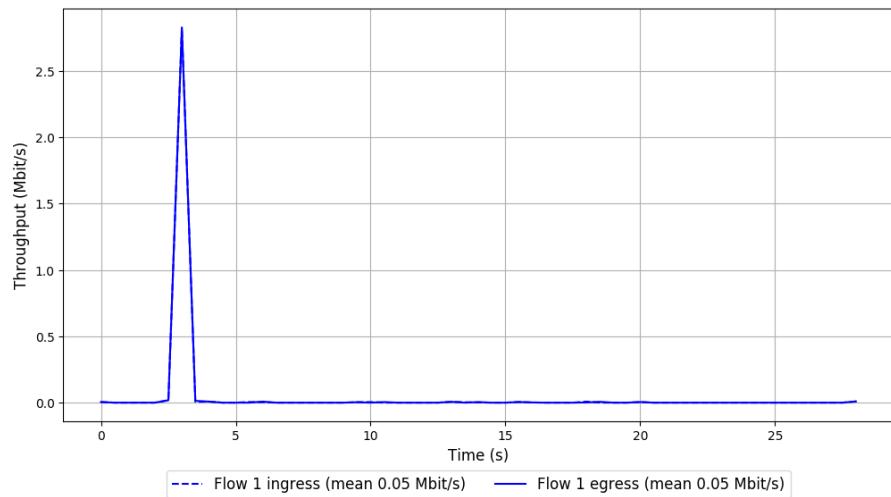


Run 3: Statistics of WebRTC media

```
Start at: 2018-02-19 17:05:46
End at: 2018-02-19 17:06:16
Local clock offset: 1.721 ms
Remote clock offset: -4.987 ms

# Below is generated by plot.py at 2018-02-19 18:35:16
# Datalink statistics
-- Total of 1 flow:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 89.575 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 89.575 ms
Loss rate: 0.00%
```

Run 3: Report of WebRTC media — Data Link

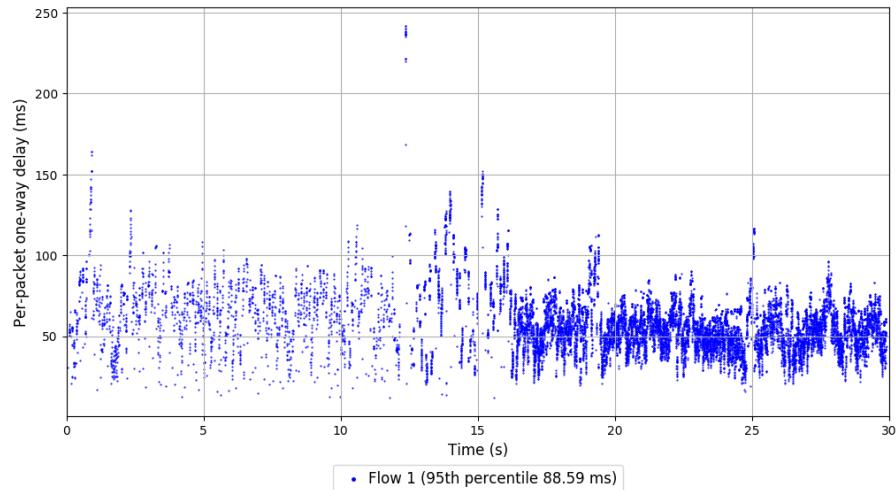
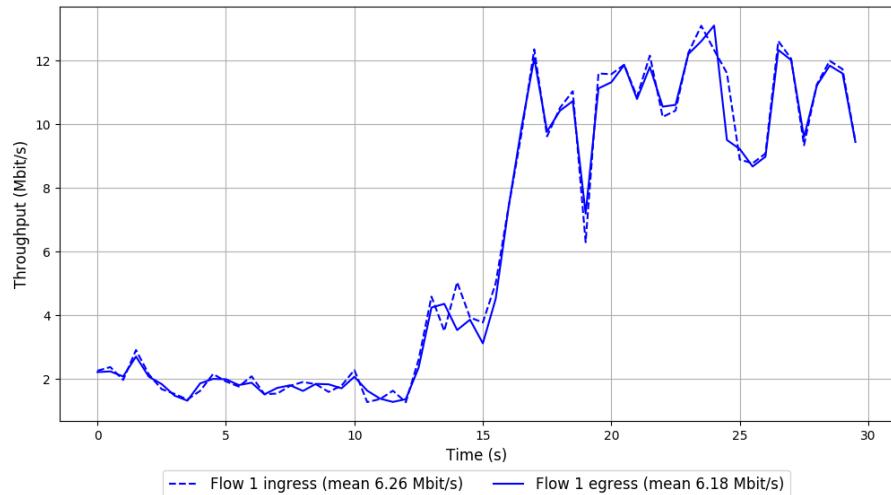


Run 1: Statistics of Sprout

```
Start at: 2018-02-19 16:25:10
End at: 2018-02-19 16:25:40
Local clock offset: 2.251 ms
Remote clock offset: -6.491 ms

# Below is generated by plot.py at 2018-02-19 18:35:18
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.18 Mbit/s
95th percentile per-packet one-way delay: 88.588 ms
Loss rate: 1.34%
-- Flow 1:
Average throughput: 6.18 Mbit/s
95th percentile per-packet one-way delay: 88.588 ms
Loss rate: 1.34%
```

Run 1: Report of Sprout — Data Link

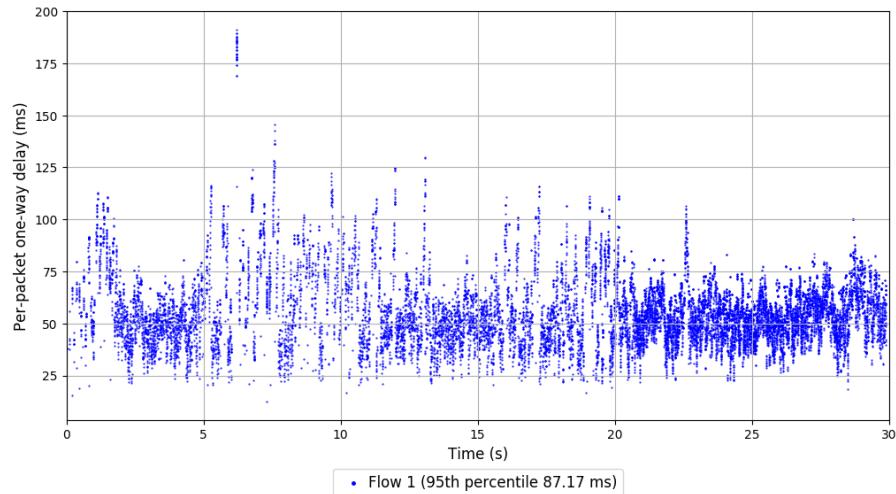
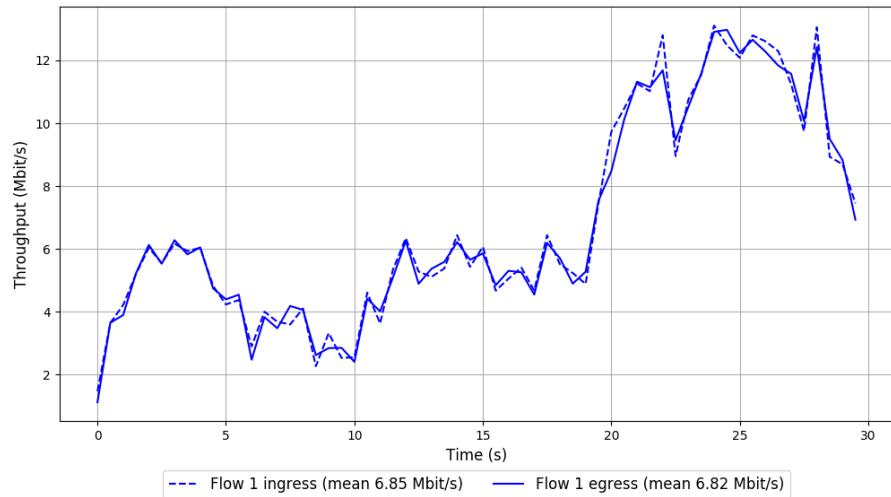


Run 2: Statistics of Sprout

```
Start at: 2018-02-19 16:48:44
End at: 2018-02-19 16:49:14
Local clock offset: 2.014 ms
Remote clock offset: -4.432 ms

# Below is generated by plot.py at 2018-02-19 18:35:20
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 87.170 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 87.170 ms
Loss rate: 0.74%
```

Run 2: Report of Sprout — Data Link

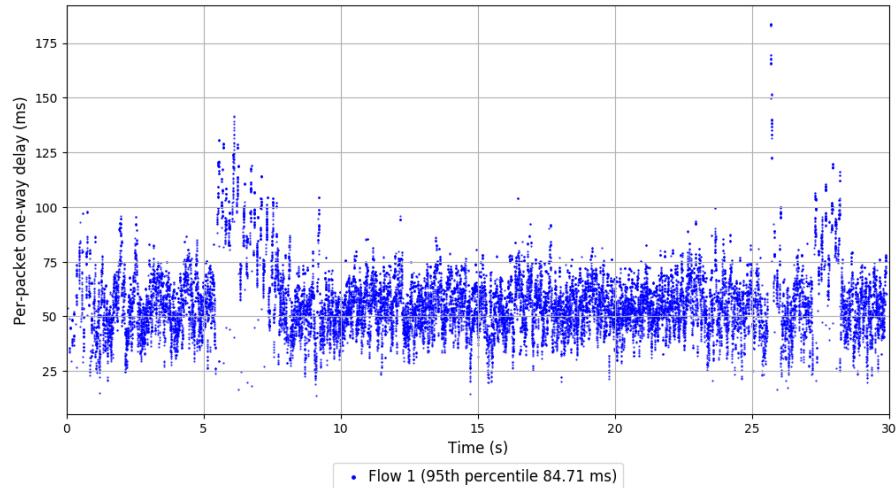
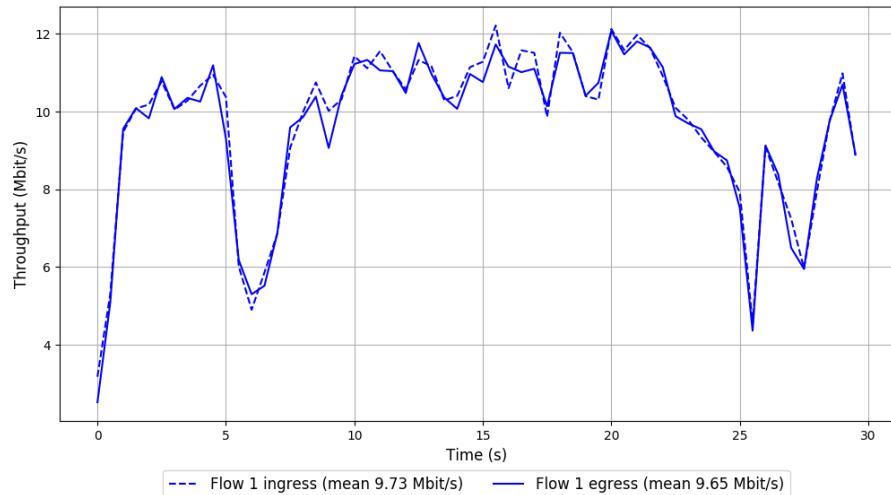


Run 3: Statistics of Sprout

```
Start at: 2018-02-19 17:12:19
End at: 2018-02-19 17:12:49
Local clock offset: 1.677 ms
Remote clock offset: -5.358 ms

# Below is generated by plot.py at 2018-02-19 18:35:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.65 Mbit/s
95th percentile per-packet one-way delay: 84.711 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 9.65 Mbit/s
95th percentile per-packet one-way delay: 84.711 ms
Loss rate: 1.00%
```

Run 3: Report of Sprout — Data Link

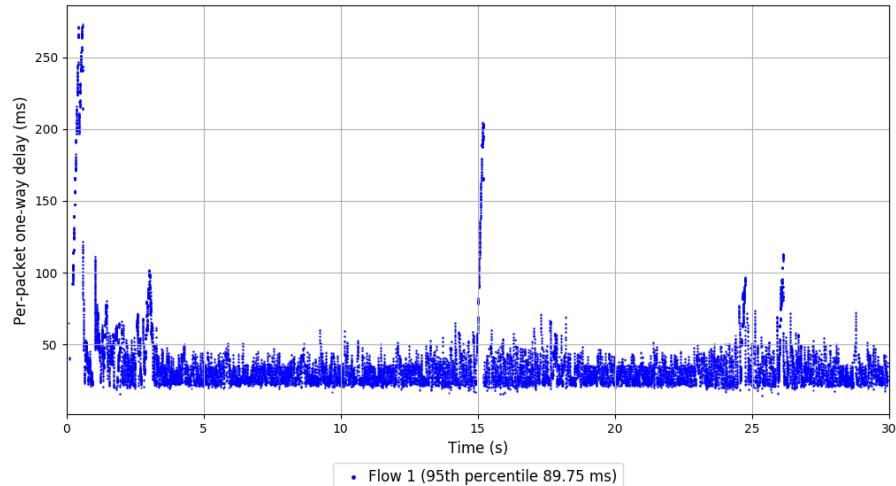
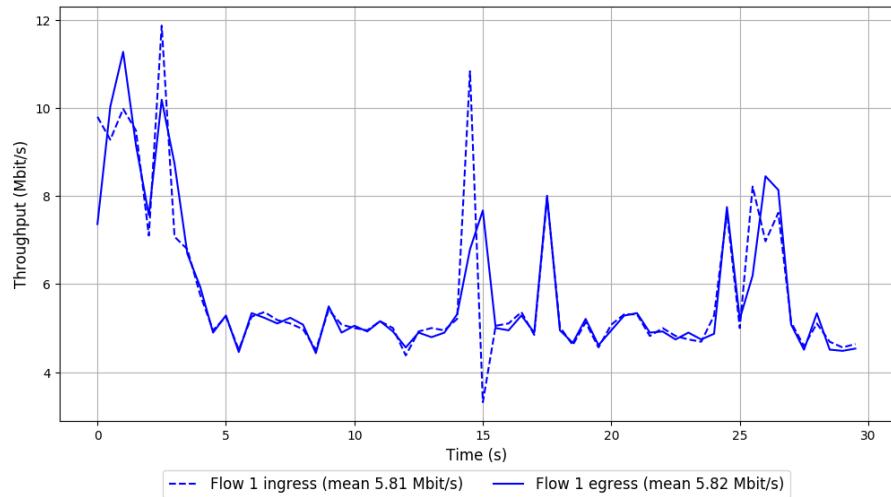


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-02-19 16:15:59
End at: 2018-02-19 16:16:29
Local clock offset: 2.261 ms
Remote clock offset: -6.531 ms

# Below is generated by plot.py at 2018-02-19 18:35:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.82 Mbit/s
95th percentile per-packet one-way delay: 89.755 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 5.82 Mbit/s
95th percentile per-packet one-way delay: 89.755 ms
Loss rate: 0.16%
```

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

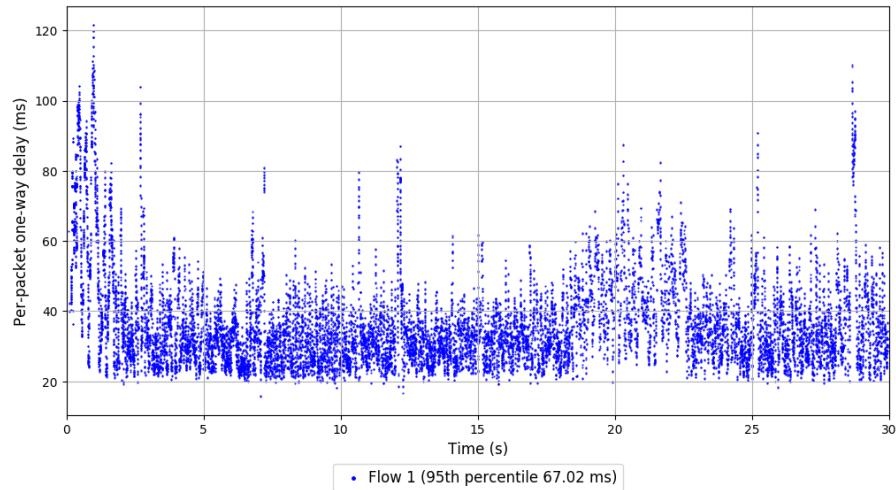
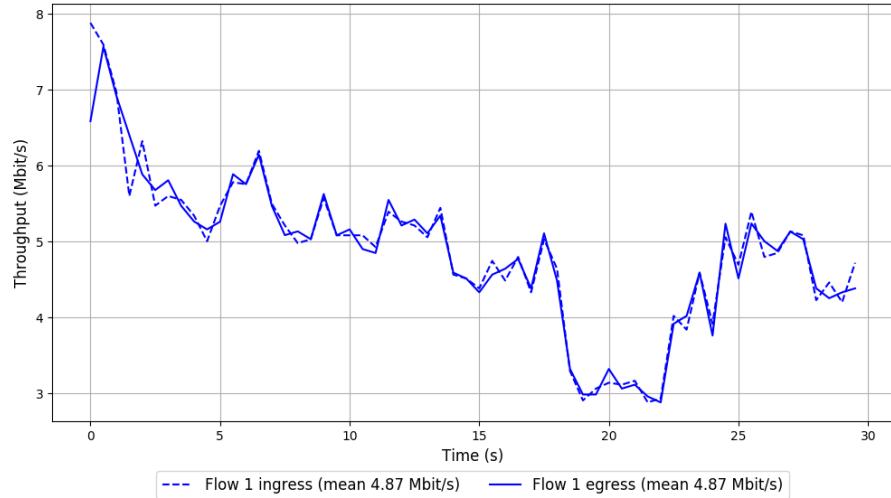


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-02-19 16:39:34
End at: 2018-02-19 16:40:04
Local clock offset: 2.404 ms
Remote clock offset: -5.021 ms

# Below is generated by plot.py at 2018-02-19 18:35:27
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 67.022 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 4.87 Mbit/s
95th percentile per-packet one-way delay: 67.022 ms
Loss rate: 0.35%
```

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

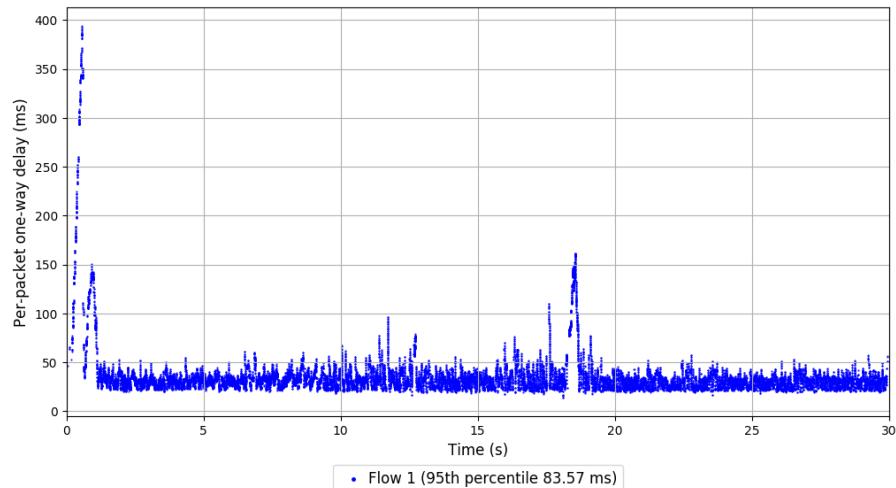
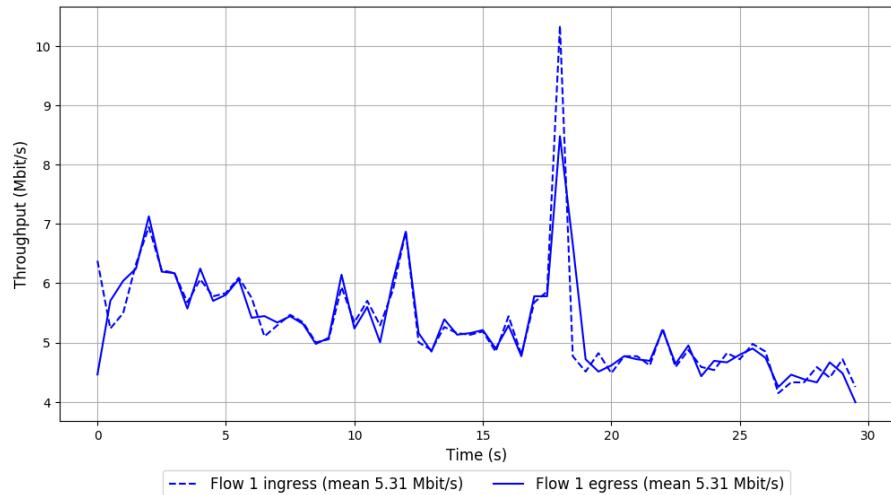


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-02-19 17:03:08
End at: 2018-02-19 17:03:38
Local clock offset: 1.737 ms
Remote clock offset: -4.681 ms

# Below is generated by plot.py at 2018-02-19 18:35:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.31 Mbit/s
95th percentile per-packet one-way delay: 83.566 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 5.31 Mbit/s
95th percentile per-packet one-way delay: 83.566 ms
Loss rate: 0.35%
```

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

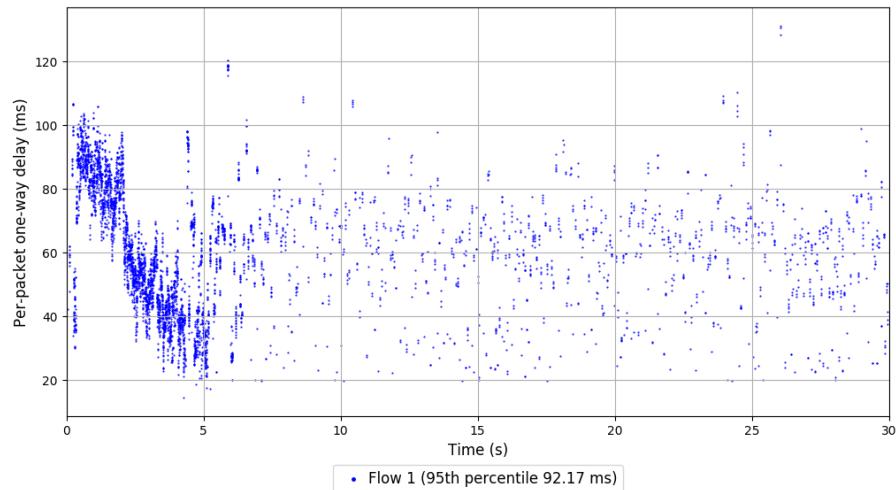
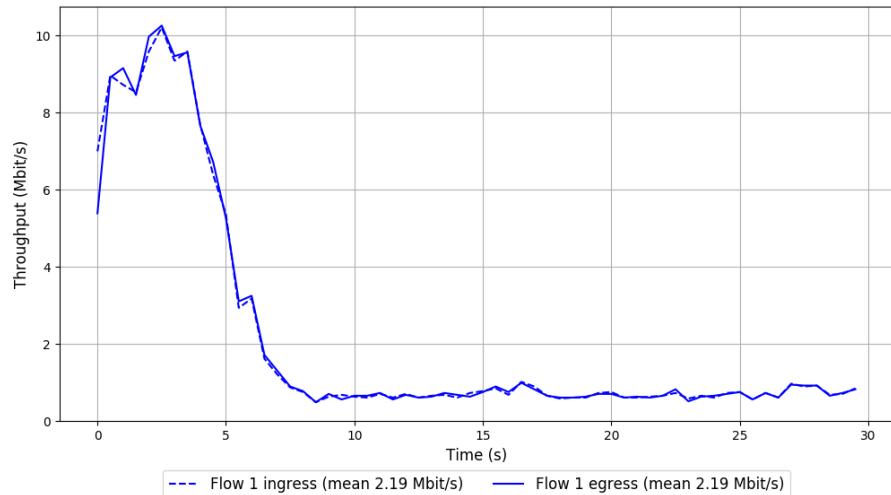


Run 1: Statistics of TCP Vegas

```
Start at: 2018-02-19 16:34:20
End at: 2018-02-19 16:34:50
Local clock offset: 2.342 ms
Remote clock offset: -5.377 ms

# Below is generated by plot.py at 2018-02-19 18:35:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 92.170 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 92.170 ms
Loss rate: 0.09%
```

Run 1: Report of TCP Vegas — Data Link

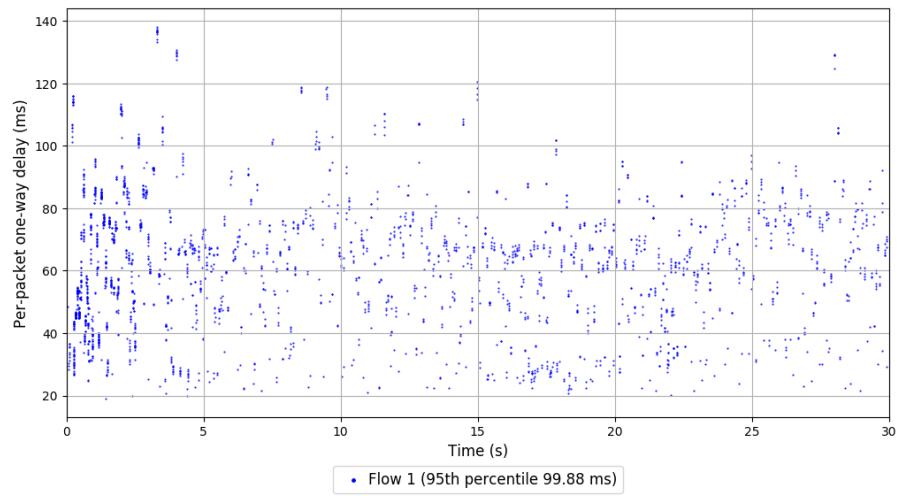
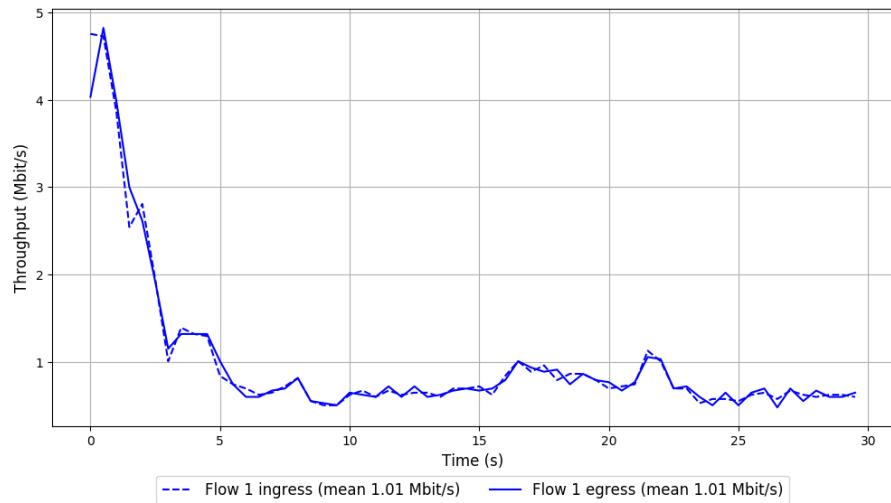


Run 2: Statistics of TCP Vegas

```
Start at: 2018-02-19 16:57:54
End at: 2018-02-19 16:58:24
Local clock offset: 1.8 ms
Remote clock offset: -3.853 ms

# Below is generated by plot.py at 2018-02-19 18:35:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 99.884 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 99.884 ms
Loss rate: 0.12%
```

Run 2: Report of TCP Vegas — Data Link

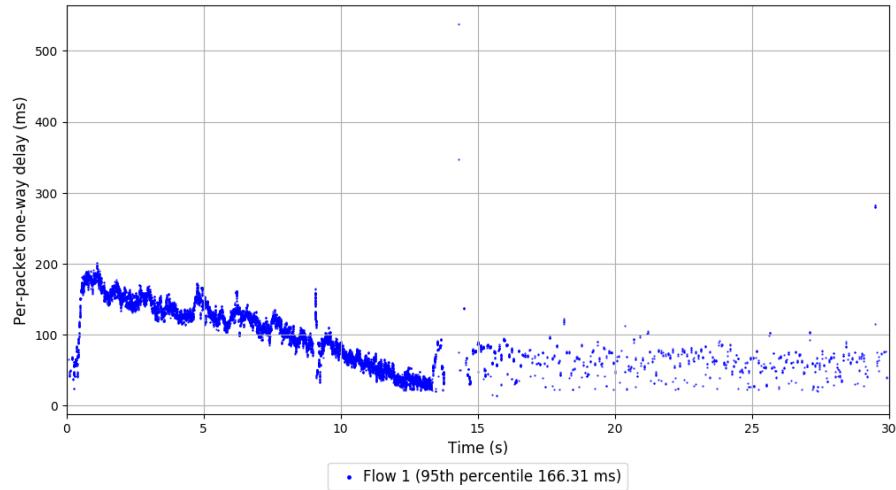
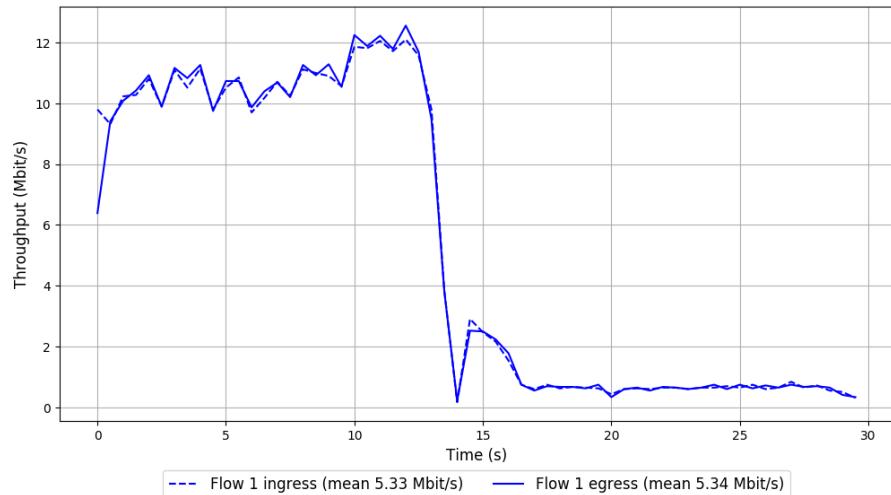


Run 3: Statistics of TCP Vegas

```
Start at: 2018-02-19 17:21:28
End at: 2018-02-19 17:21:58
Local clock offset: 0.814 ms
Remote clock offset: -5.44 ms

# Below is generated by plot.py at 2018-02-19 18:35:29
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.34 Mbit/s
95th percentile per-packet one-way delay: 166.313 ms
Loss rate: 0.31%
-- Flow 1:
Average throughput: 5.34 Mbit/s
95th percentile per-packet one-way delay: 166.313 ms
Loss rate: 0.31%
```

Run 3: Report of TCP Vegas — Data Link

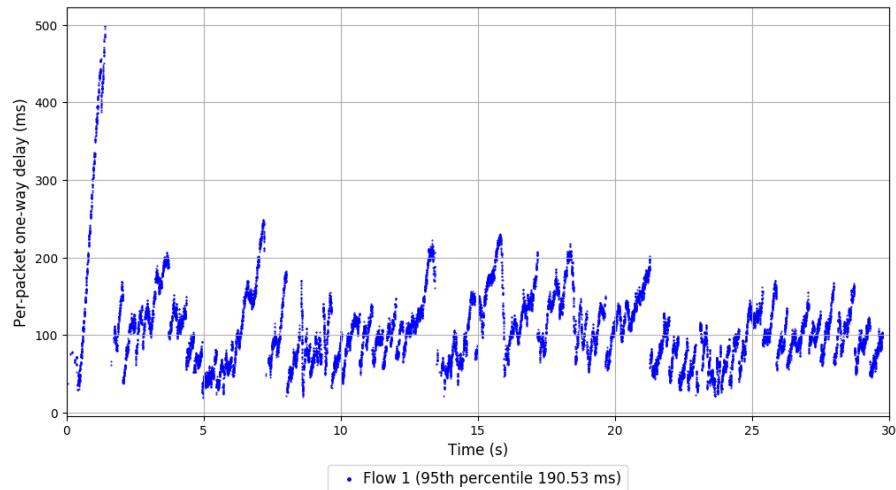
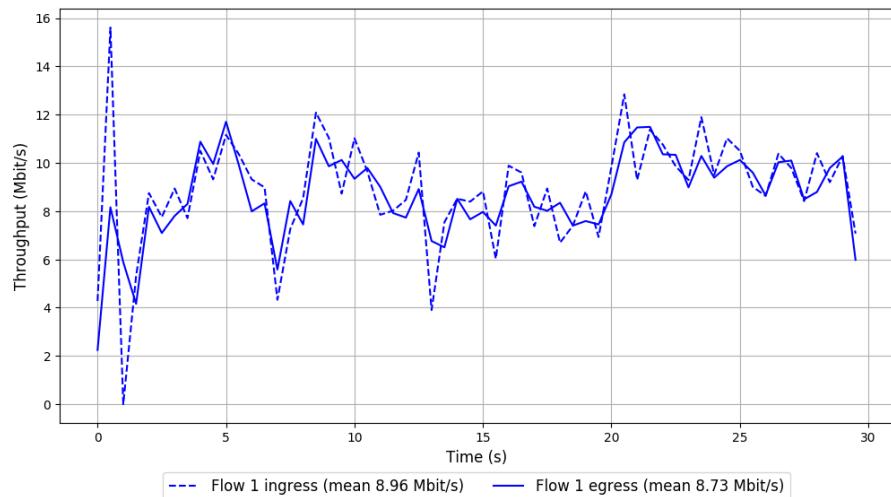


Run 1: Statistics of Verus

```
Start at: 2018-02-19 16:23:52
End at: 2018-02-19 16:24:22
Local clock offset: 2.25 ms
Remote clock offset: -6.637 ms

# Below is generated by plot.py at 2018-02-19 18:35:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.73 Mbit/s
95th percentile per-packet one-way delay: 190.535 ms
Loss rate: 2.68%
-- Flow 1:
Average throughput: 8.73 Mbit/s
95th percentile per-packet one-way delay: 190.535 ms
Loss rate: 2.68%
```

Run 1: Report of Verus — Data Link

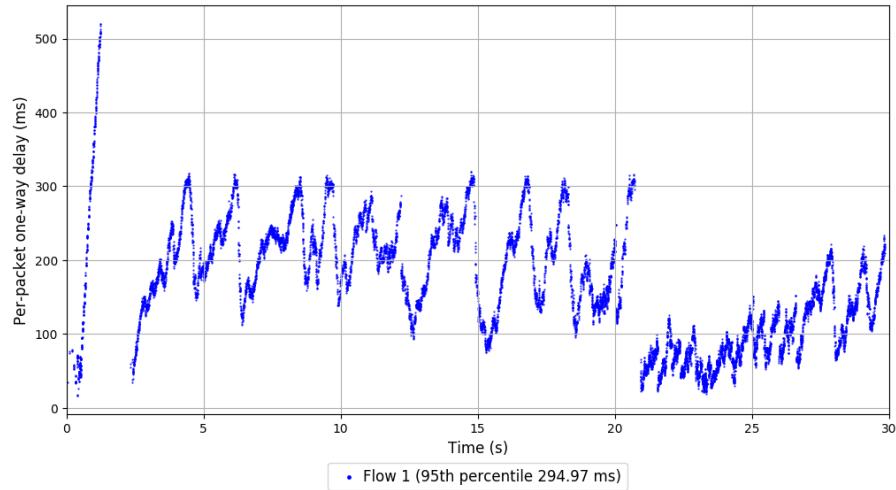
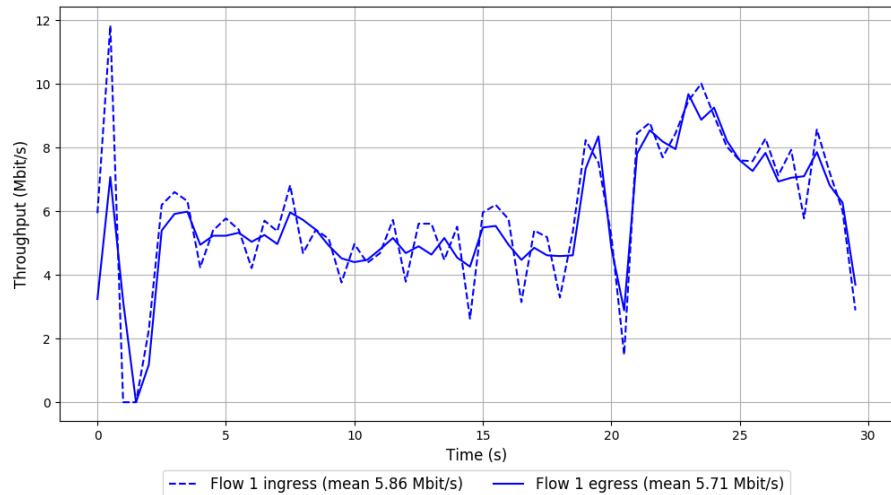


Run 2: Statistics of Verus

```
Start at: 2018-02-19 16:47:25
End at: 2018-02-19 16:47:55
Local clock offset: 2.066 ms
Remote clock offset: -4.528 ms

# Below is generated by plot.py at 2018-02-19 18:35:31
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.71 Mbit/s
95th percentile per-packet one-way delay: 294.969 ms
Loss rate: 2.58%
-- Flow 1:
Average throughput: 5.71 Mbit/s
95th percentile per-packet one-way delay: 294.969 ms
Loss rate: 2.58%
```

Run 2: Report of Verus — Data Link

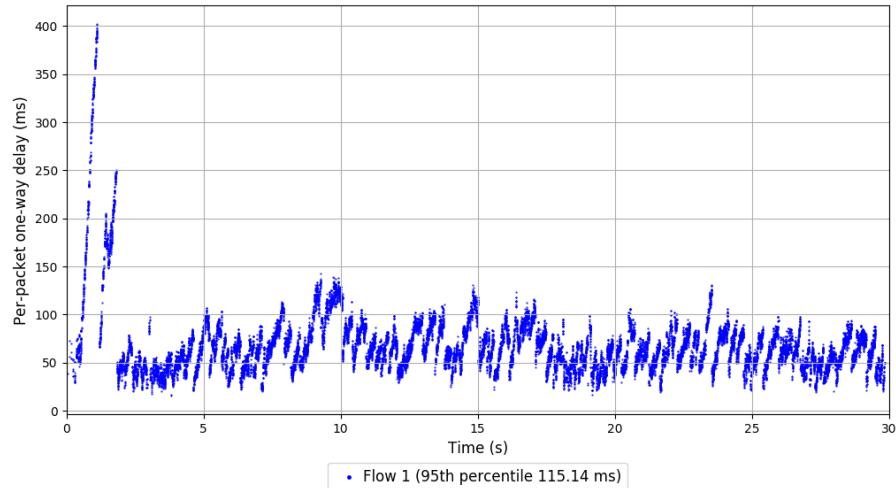
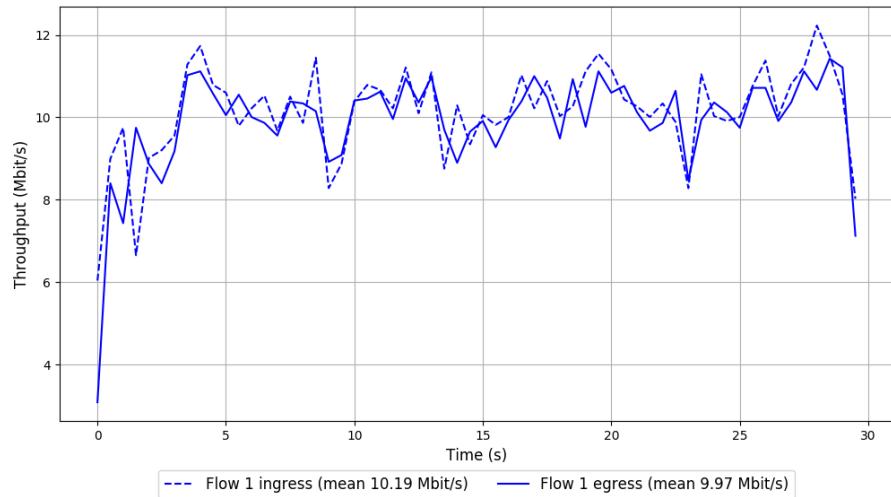


Run 3: Statistics of Verus

```
Start at: 2018-02-19 17:11:00
End at: 2018-02-19 17:11:30
Local clock offset: 1.684 ms
Remote clock offset: -5.289 ms

# Below is generated by plot.py at 2018-02-19 18:35:33
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.97 Mbit/s
95th percentile per-packet one-way delay: 115.145 ms
Loss rate: 2.29%
-- Flow 1:
Average throughput: 9.97 Mbit/s
95th percentile per-packet one-way delay: 115.145 ms
Loss rate: 2.29%
```

Run 3: Report of Verus — Data Link

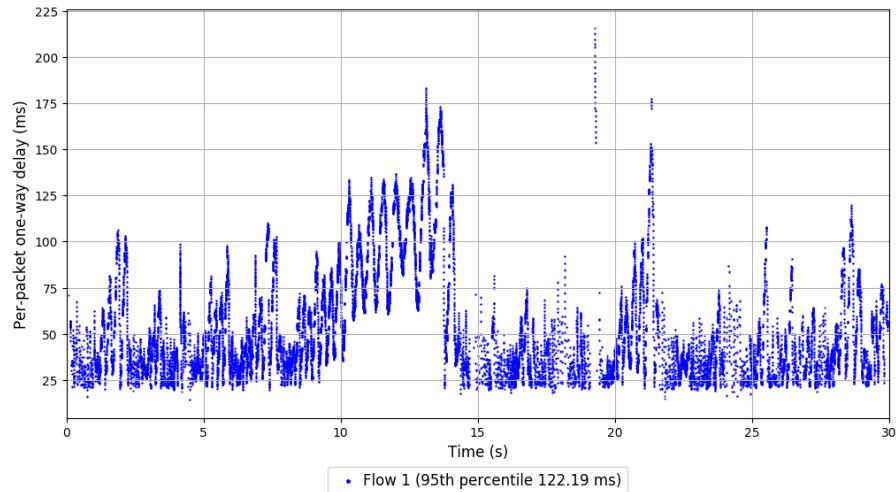
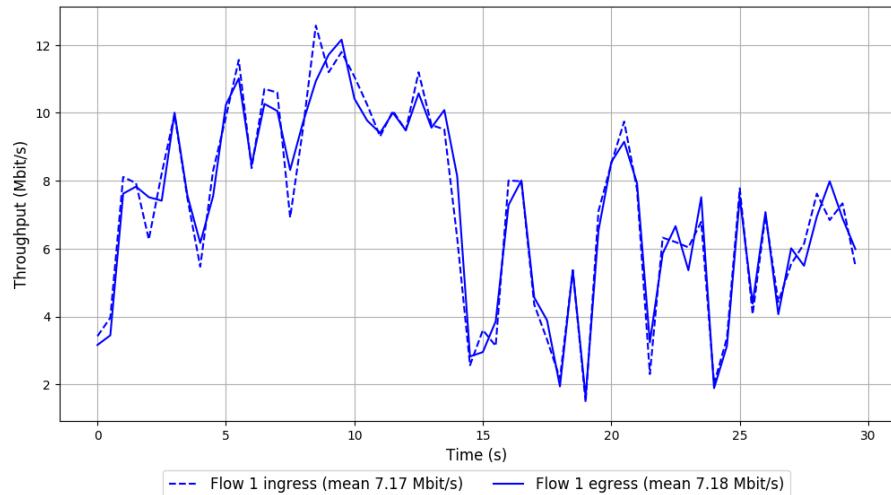


Run 1: Statistics of Copa

```
Start at: 2018-02-19 16:35:38
End at: 2018-02-19 16:36:08
Local clock offset: 2.353 ms
Remote clock offset: -5.259 ms

# Below is generated by plot.py at 2018-02-19 18:35:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.18 Mbit/s
95th percentile per-packet one-way delay: 122.192 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 7.18 Mbit/s
95th percentile per-packet one-way delay: 122.192 ms
Loss rate: 0.07%
```

Run 1: Report of Copa — Data Link

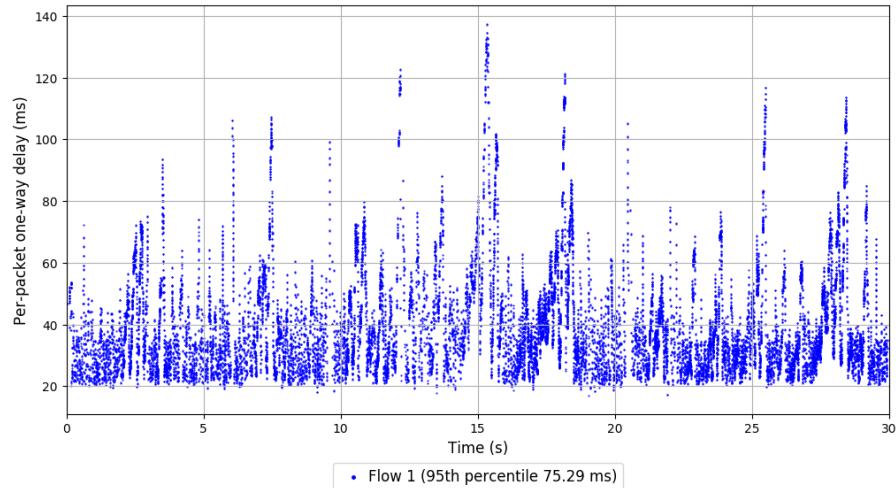
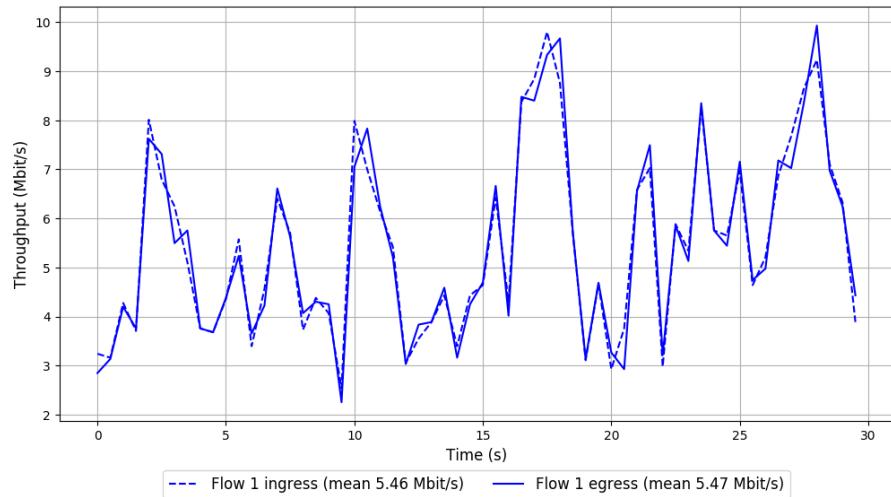


Run 2: Statistics of Copa

```
Start at: 2018-02-19 16:59:12
End at: 2018-02-19 16:59:42
Local clock offset: 1.774 ms
Remote clock offset: -3.963 ms

# Below is generated by plot.py at 2018-02-19 18:35:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.47 Mbit/s
95th percentile per-packet one-way delay: 75.287 ms
Loss rate: 0.08%
-- Flow 1:
Average throughput: 5.47 Mbit/s
95th percentile per-packet one-way delay: 75.287 ms
Loss rate: 0.08%
```

Run 2: Report of Copa — Data Link

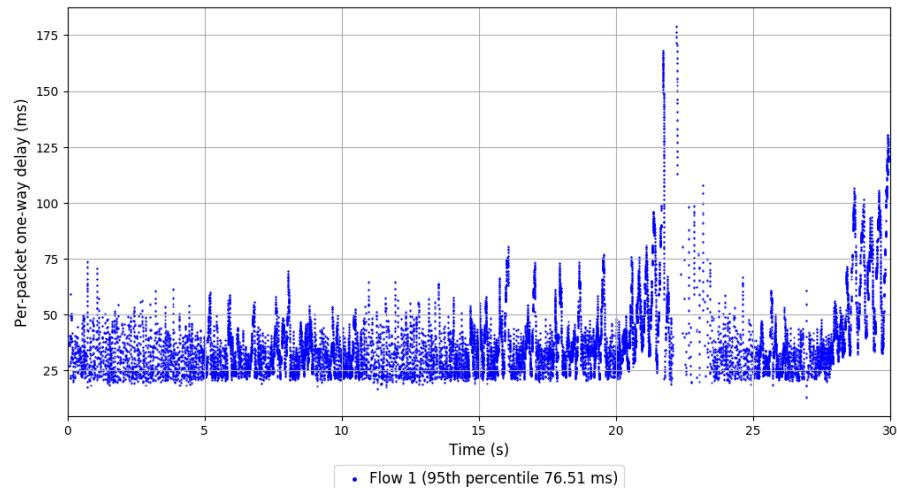
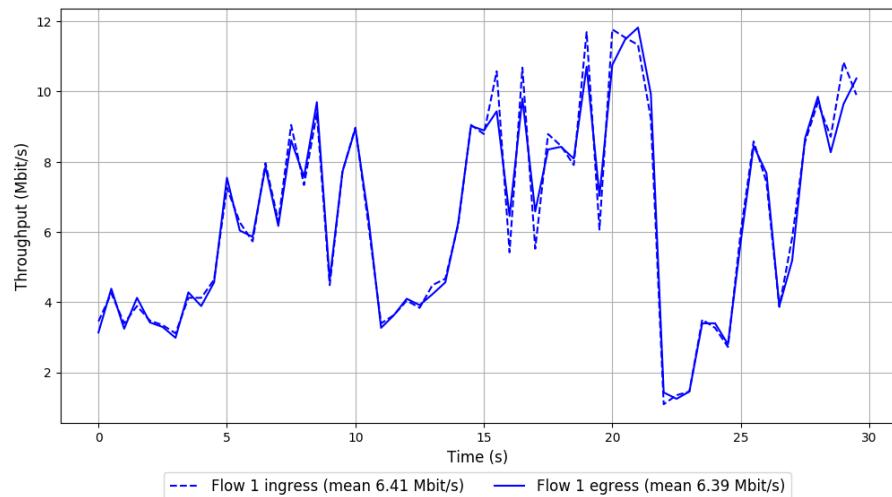


Run 3: Statistics of Copa

```
Start at: 2018-02-19 17:22:47
End at: 2018-02-19 17:23:17
Local clock offset: 0.584 ms
Remote clock offset: -5.554 ms

# Below is generated by plot.py at 2018-02-19 18:35:44
# Datalink statistics
-- Total of 1 flow:
Average throughput: 6.39 Mbit/s
95th percentile per-packet one-way delay: 76.508 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 6.39 Mbit/s
95th percentile per-packet one-way delay: 76.508 ms
Loss rate: 0.47%
```

Run 3: Report of Copa — Data Link

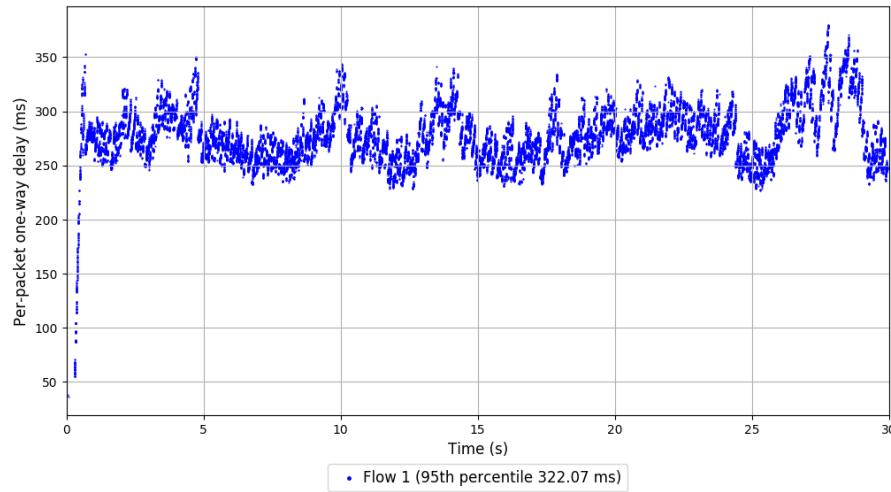
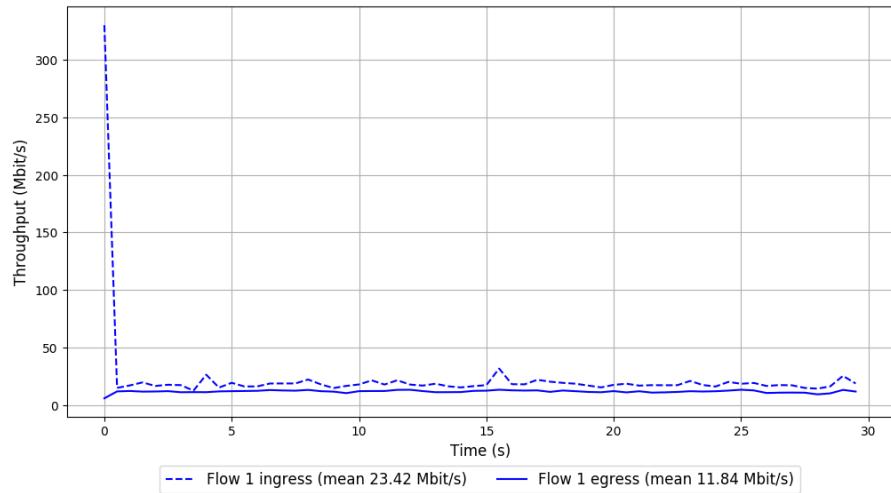


```
Run 1: Statistics of FillP
```

```
Start at: 2018-02-19 16:14:40
End at: 2018-02-19 16:15:10
Local clock offset: 2.164 ms
Remote clock offset: -6.578 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 11.84 Mbit/s
95th percentile per-packet one-way delay: 322.067 ms
Loss rate: 49.56%
-- Flow 1:
Average throughput: 11.84 Mbit/s
95th percentile per-packet one-way delay: 322.067 ms
Loss rate: 49.56%
```

Run 1: Report of FillP — Data Link

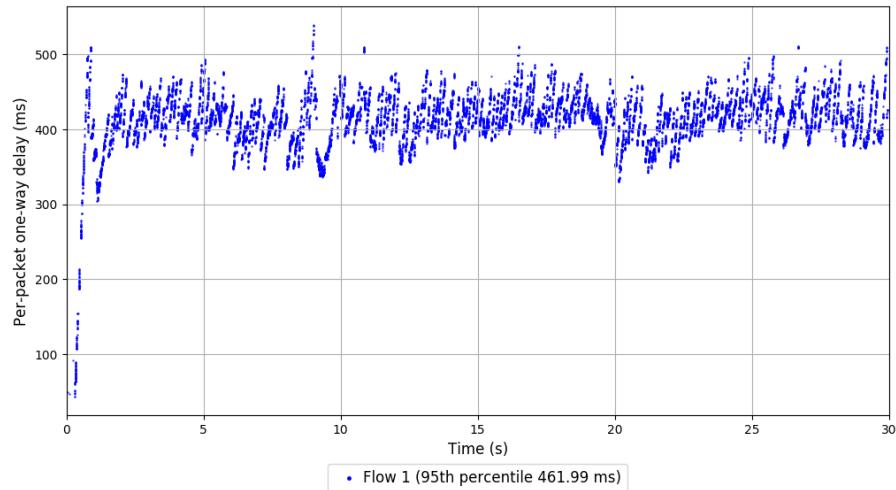
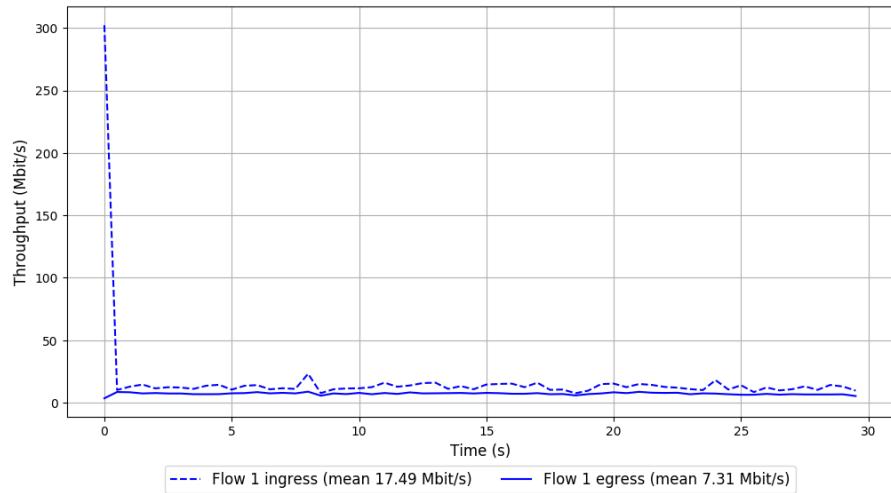


Run 2: Statistics of FillP

```
Start at: 2018-02-19 16:38:16
End at: 2018-02-19 16:38:46
Local clock offset: 2.275 ms
Remote clock offset: -5.105 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.31 Mbit/s
95th percentile per-packet one-way delay: 461.986 ms
Loss rate: 58.29%
-- Flow 1:
Average throughput: 7.31 Mbit/s
95th percentile per-packet one-way delay: 461.986 ms
Loss rate: 58.29%
```

Run 2: Report of FillP — Data Link

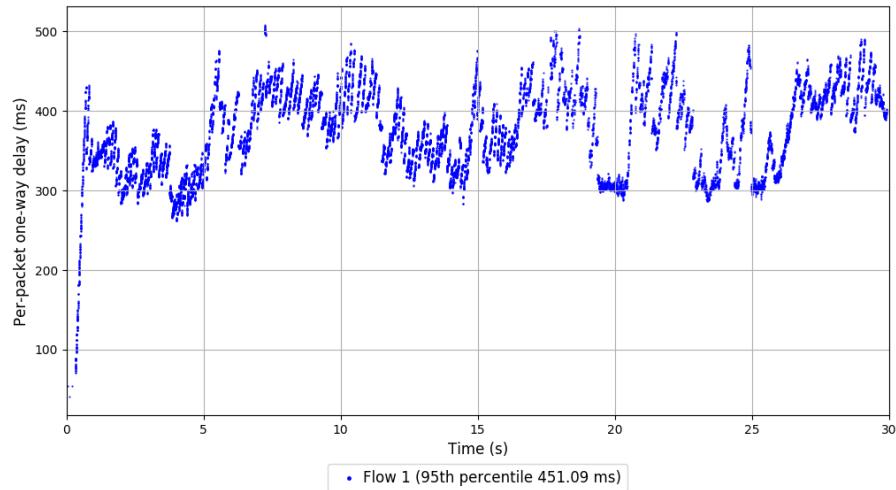
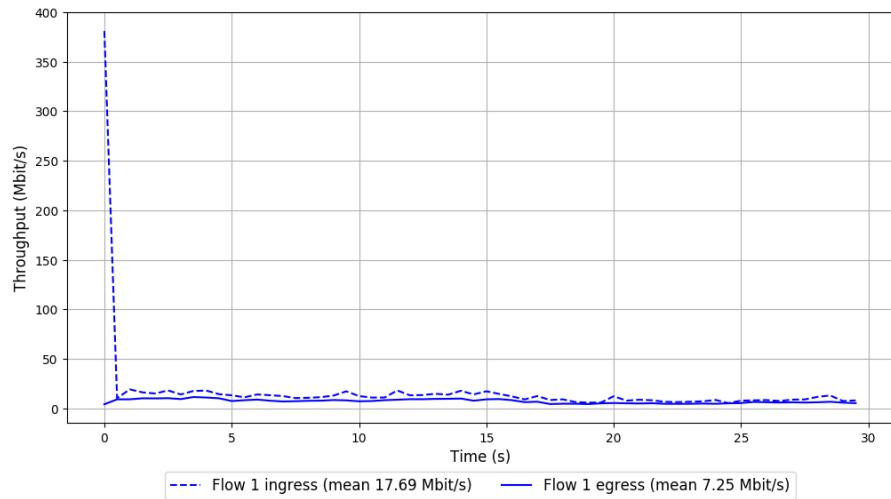


Run 3: Statistics of FillP

```
Start at: 2018-02-19 17:01:49
End at: 2018-02-19 17:02:19
Local clock offset: 1.738 ms
Remote clock offset: -4.443 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.25 Mbit/s
95th percentile per-packet one-way delay: 451.087 ms
Loss rate: 59.09%
-- Flow 1:
Average throughput: 7.25 Mbit/s
95th percentile per-packet one-way delay: 451.087 ms
Loss rate: 59.09%
```

Run 3: Report of FillP — Data Link

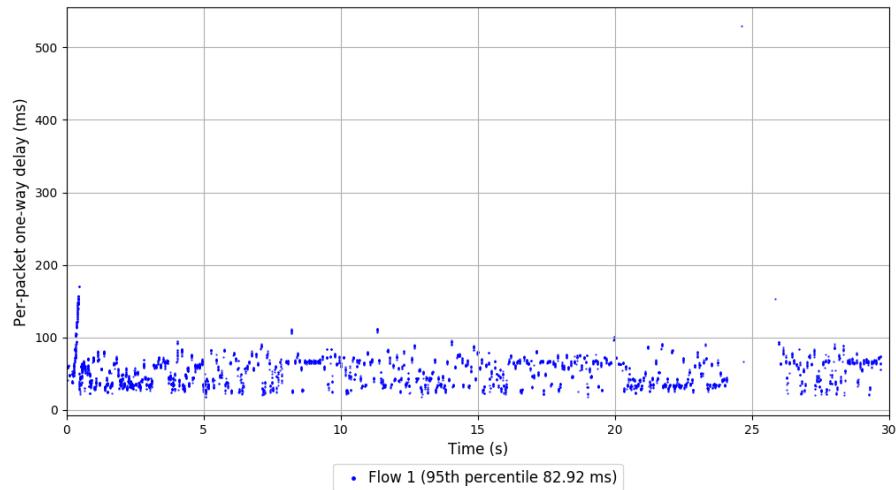
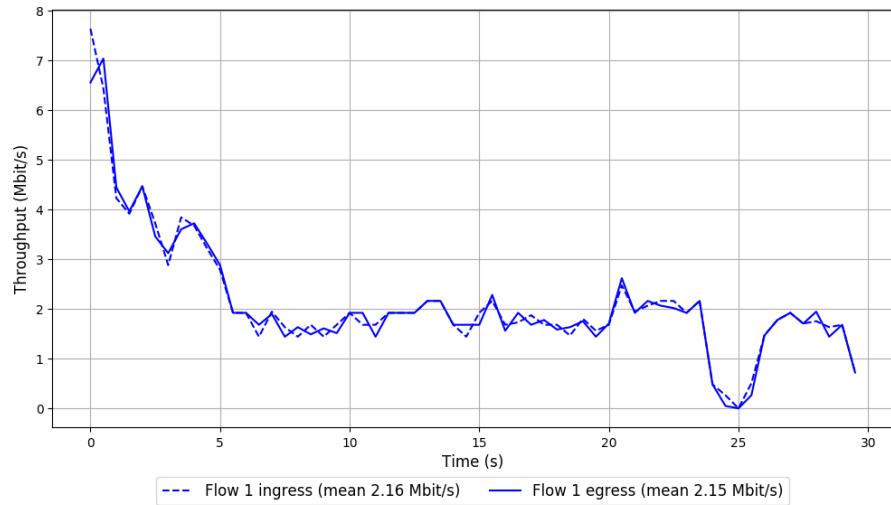


Run 1: Statistics of Indigo-1-32

```
Start at: 2018-02-19 16:27:47
End at: 2018-02-19 16:28:17
Local clock offset: 2.287 ms
Remote clock offset: -6.079 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 82.918 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 2.15 Mbit/s
95th percentile per-packet one-way delay: 82.918 ms
Loss rate: 0.54%
```

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

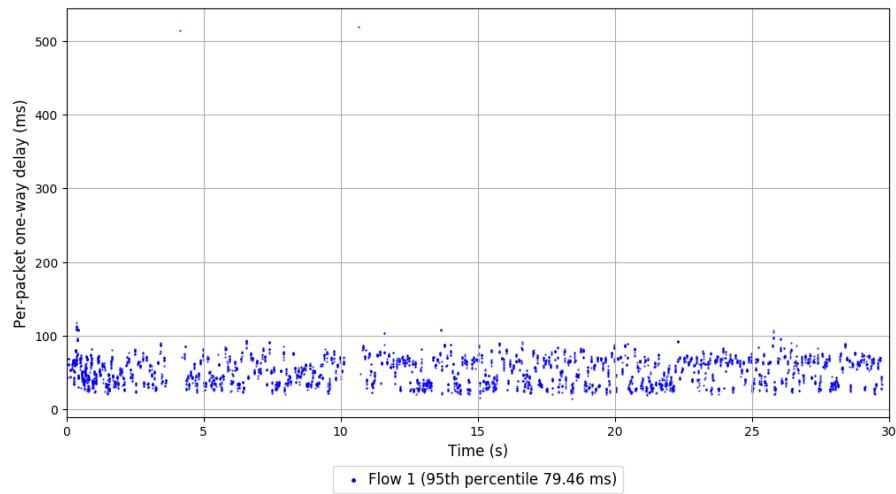
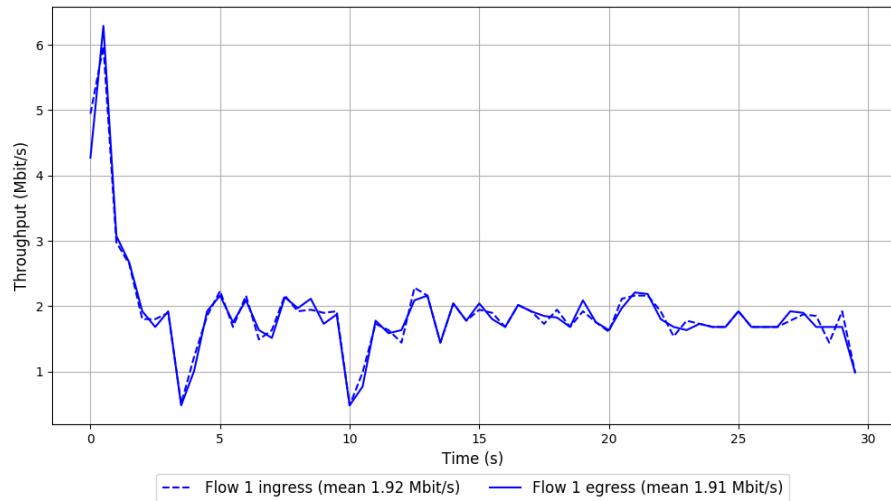


Run 2: Statistics of Indigo-1-32

```
Start at: 2018-02-19 16:51:21
End at: 2018-02-19 16:51:51
Local clock offset: 1.924 ms
Remote clock offset: -4.184 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 79.464 ms
Loss rate: 0.59%
-- Flow 1:
Average throughput: 1.91 Mbit/s
95th percentile per-packet one-way delay: 79.464 ms
Loss rate: 0.59%
```

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

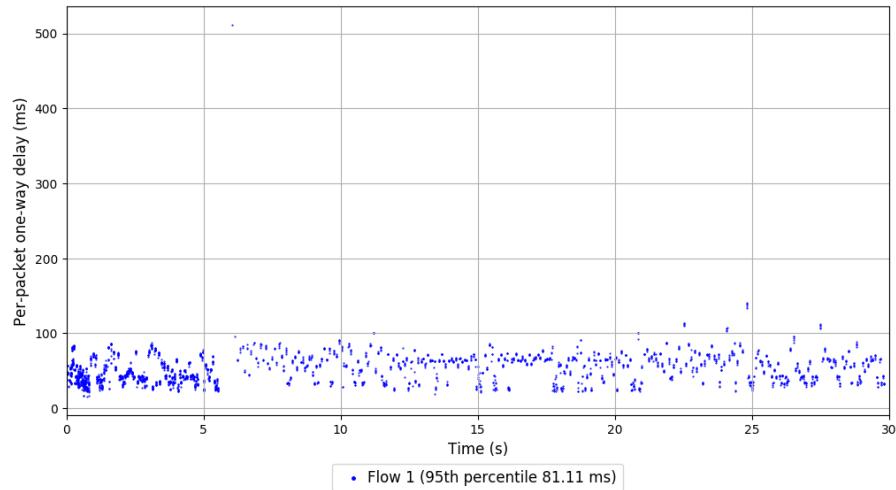
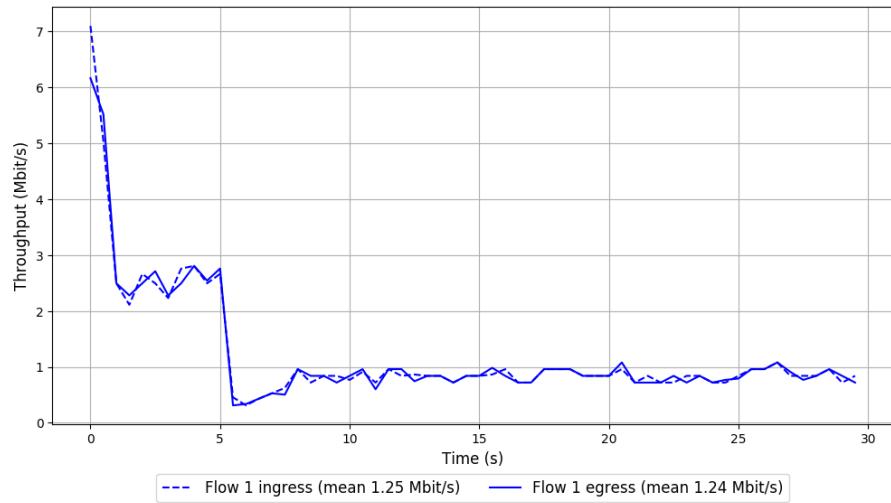


Run 3: Statistics of Indigo-1-32

```
Start at: 2018-02-19 17:14:56
End at: 2018-02-19 17:15:26
Local clock offset: 1.576 ms
Remote clock offset: -5.471 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 81.107 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 81.107 ms
Loss rate: 0.74%
```

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

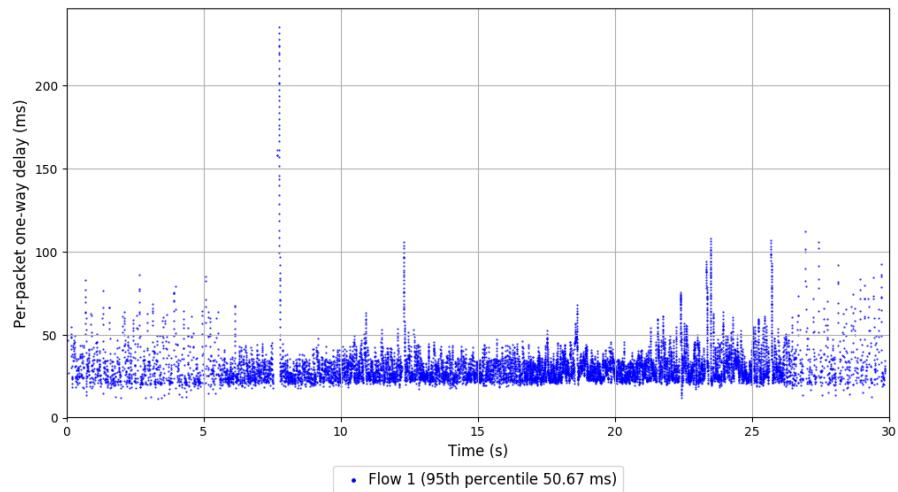
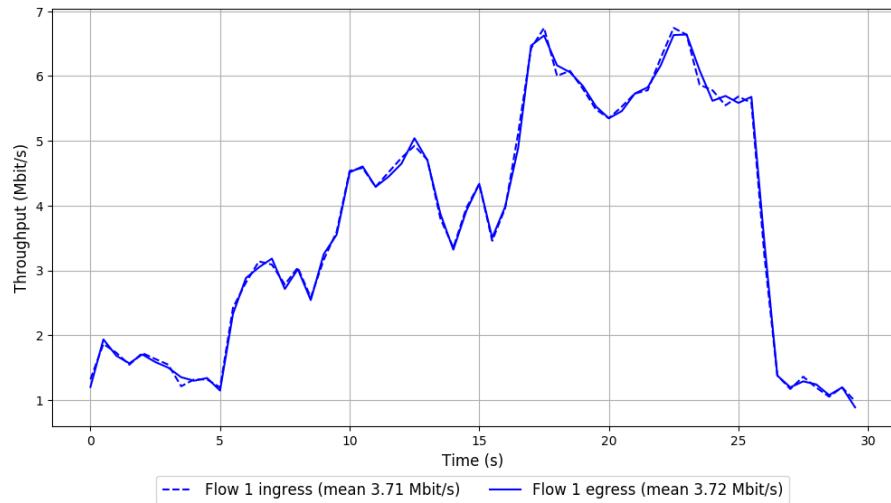


Run 1: Statistics of Vivace-latency

```
Start at: 2018-02-19 16:33:01
End at: 2018-02-19 16:33:31
Local clock offset: 2.324 ms
Remote clock offset: -5.561 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 50.675 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 3.72 Mbit/s
95th percentile per-packet one-way delay: 50.675 ms
Loss rate: 0.07%
```

Run 1: Report of Vivace-latency — Data Link

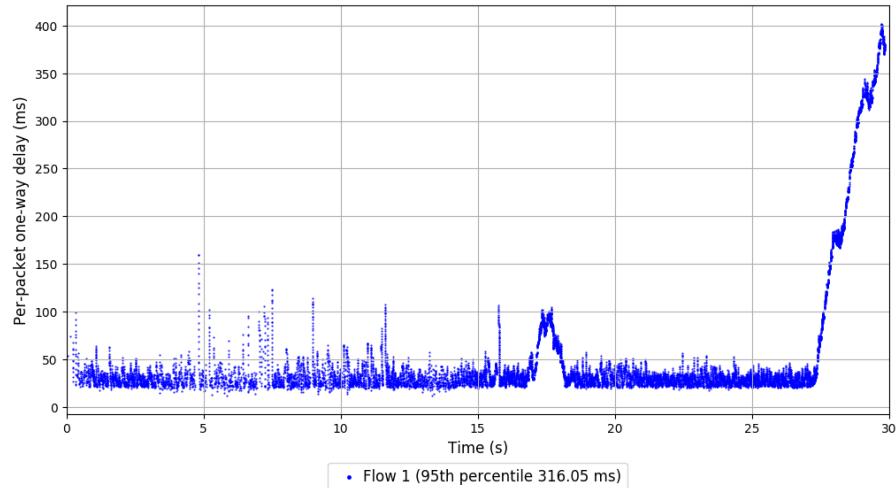
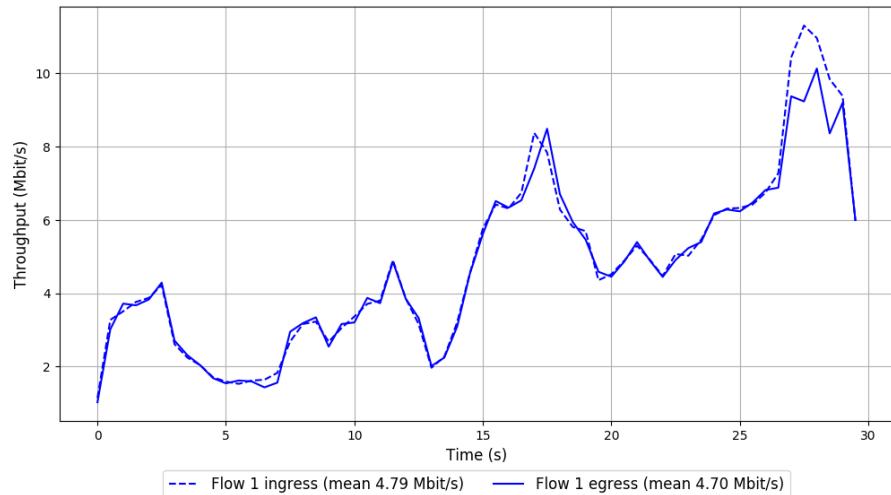


Run 2: Statistics of Vivace-latency

```
Start at: 2018-02-19 16:56:35
End at: 2018-02-19 16:57:05
Local clock offset: 1.804 ms
Remote clock offset: -3.902 ms

# Below is generated by plot.py at 2018-02-19 18:35:49
# Datalink statistics
-- Total of 1 flow:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 316.054 ms
Loss rate: 2.18%
-- Flow 1:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 316.054 ms
Loss rate: 2.18%
```

Run 2: Report of Vivace-latency — Data Link

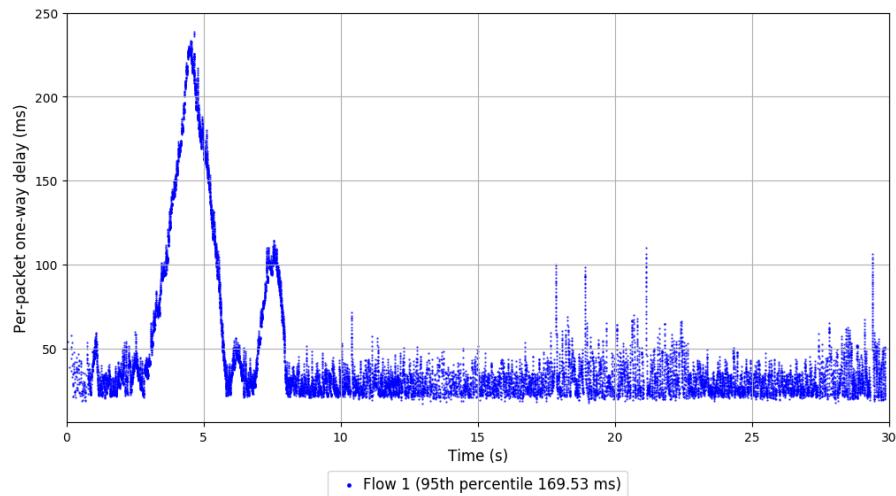
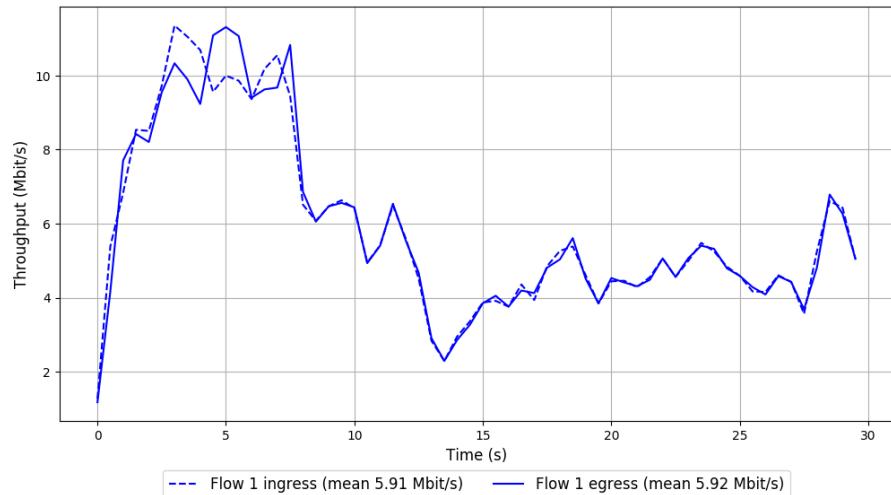


Run 3: Statistics of Vivace-latency

```
Start at: 2018-02-19 17:20:10
End at: 2018-02-19 17:20:40
Local clock offset: 0.979 ms
Remote clock offset: -5.542 ms

# Below is generated by plot.py at 2018-02-19 18:35:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 5.92 Mbit/s
95th percentile per-packet one-way delay: 169.525 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 5.92 Mbit/s
95th percentile per-packet one-way delay: 169.525 ms
Loss rate: 0.16%
```

Run 3: Report of Vivace-latency — Data Link

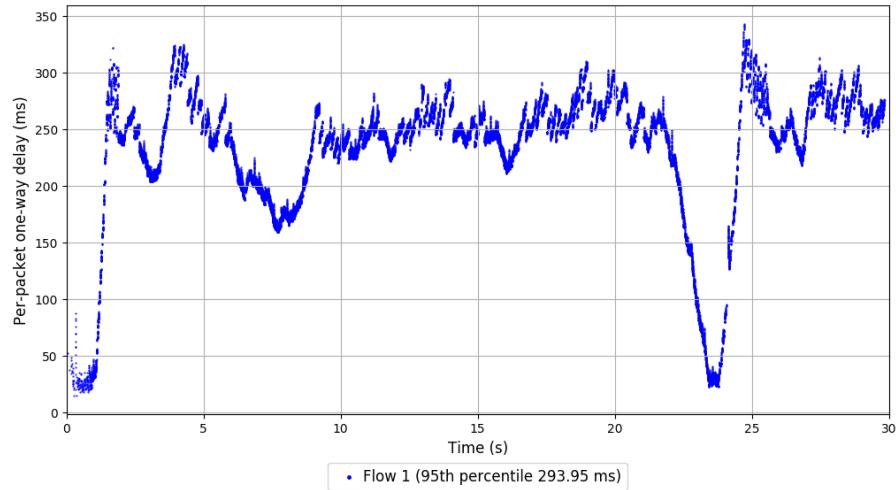
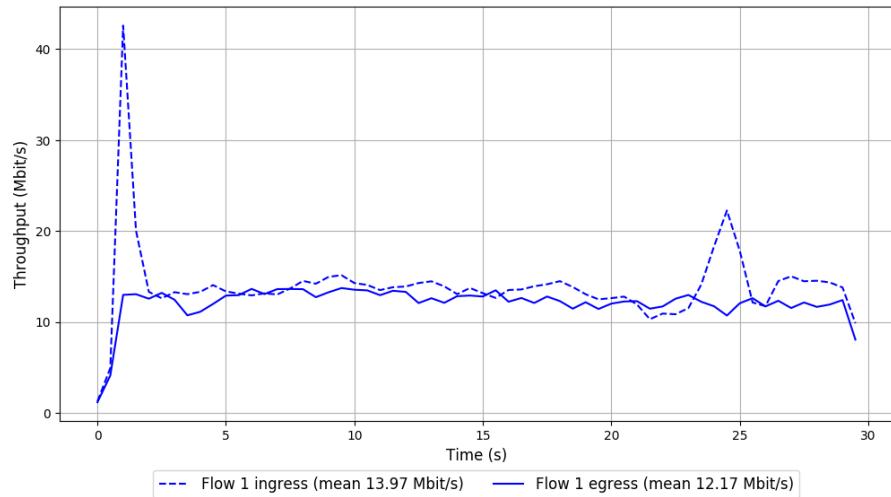


```
Run 1: Statistics of Vivace-loss
```

```
Start at: 2018-02-19 16:19:55
End at: 2018-02-19 16:20:25
Local clock offset: 2.225 ms
Remote clock offset: -6.576 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 12.17 Mbit/s
95th percentile per-packet one-way delay: 293.951 ms
Loss rate: 13.04%
-- Flow 1:
Average throughput: 12.17 Mbit/s
95th percentile per-packet one-way delay: 293.951 ms
Loss rate: 13.04%
```

Run 1: Report of Vivace-loss — Data Link

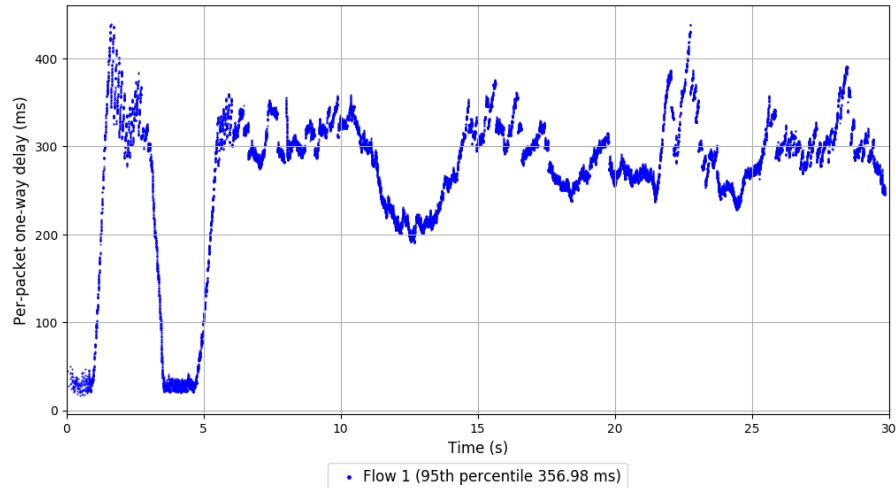
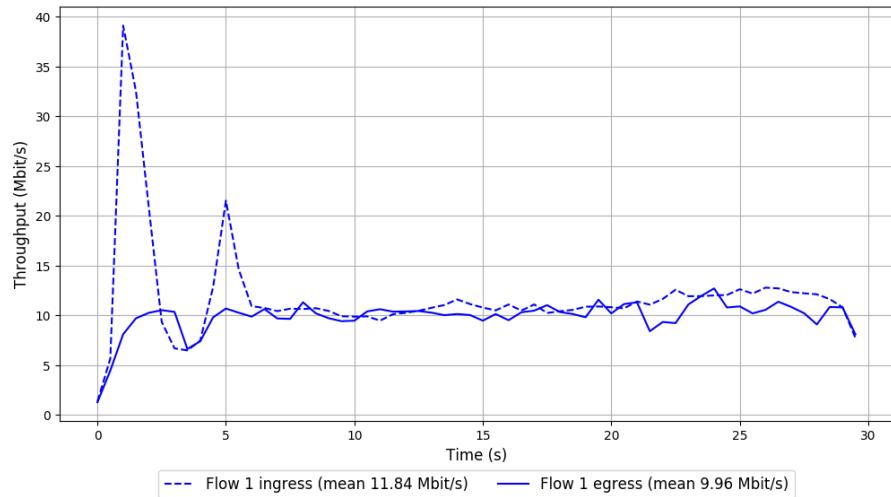


Run 2: Statistics of Vivace-loss

```
Start at: 2018-02-19 16:43:30
End at: 2018-02-19 16:44:00
Local clock offset: 2.202 ms
Remote clock offset: -4.766 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 9.96 Mbit/s
95th percentile per-packet one-way delay: 356.982 ms
Loss rate: 16.07%
-- Flow 1:
Average throughput: 9.96 Mbit/s
95th percentile per-packet one-way delay: 356.982 ms
Loss rate: 16.07%
```

Run 2: Report of Vivace-loss — Data Link

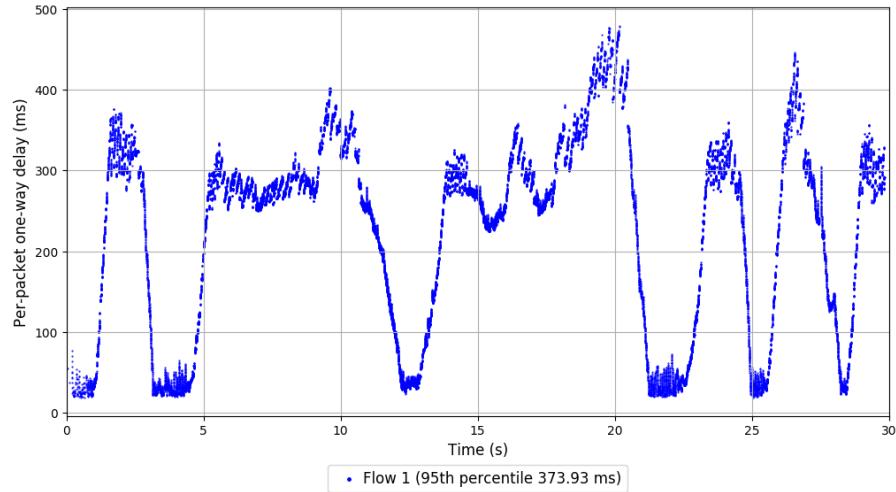
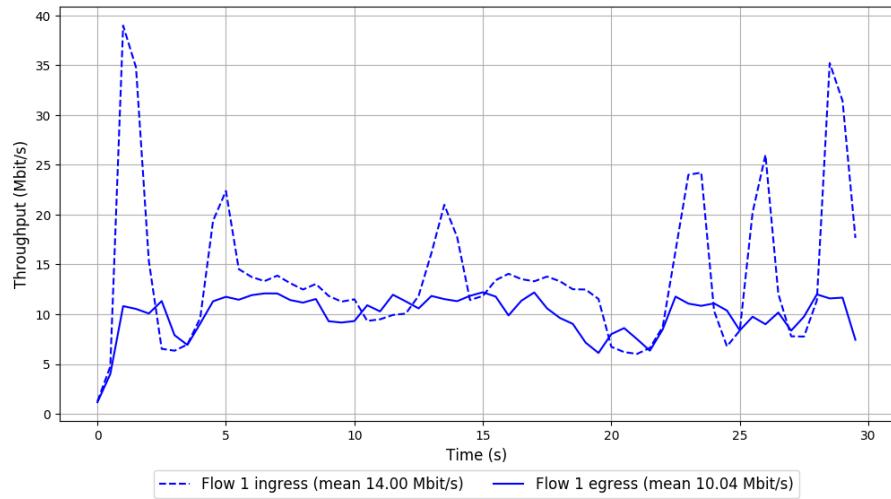


Run 3: Statistics of Vivace-loss

```
Start at: 2018-02-19 17:07:04
End at: 2018-02-19 17:07:34
Local clock offset: 1.712 ms
Remote clock offset: -5.11 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 10.04 Mbit/s
95th percentile per-packet one-way delay: 373.931 ms
Loss rate: 28.44%
-- Flow 1:
Average throughput: 10.04 Mbit/s
95th percentile per-packet one-way delay: 373.931 ms
Loss rate: 28.44%
```

Run 3: Report of Vivace-loss — Data Link

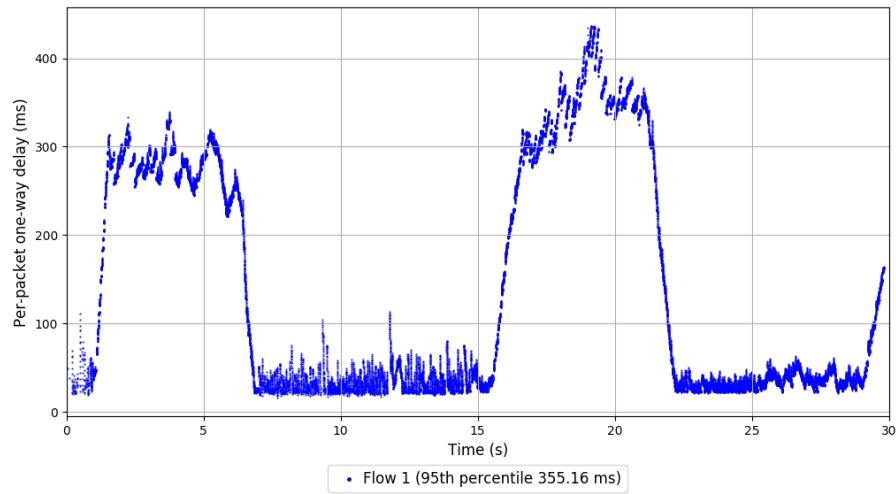
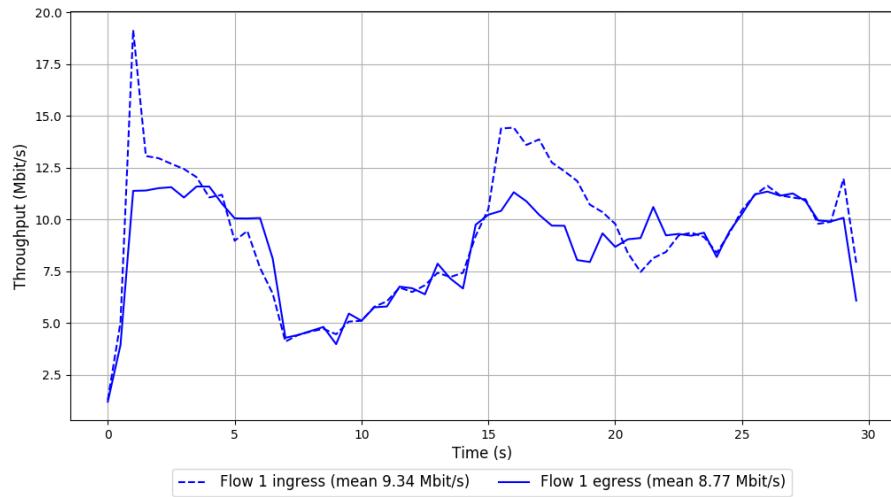


Run 1: Statistics of Vivace-LTE

```
Start at: 2018-02-19 16:29:05
End at: 2018-02-19 16:29:35
Local clock offset: 2.262 ms
Remote clock offset: -5.968 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 8.77 Mbit/s
95th percentile per-packet one-way delay: 355.160 ms
Loss rate: 6.41%
-- Flow 1:
Average throughput: 8.77 Mbit/s
95th percentile per-packet one-way delay: 355.160 ms
Loss rate: 6.41%
```

Run 1: Report of Vivace-LTE — Data Link

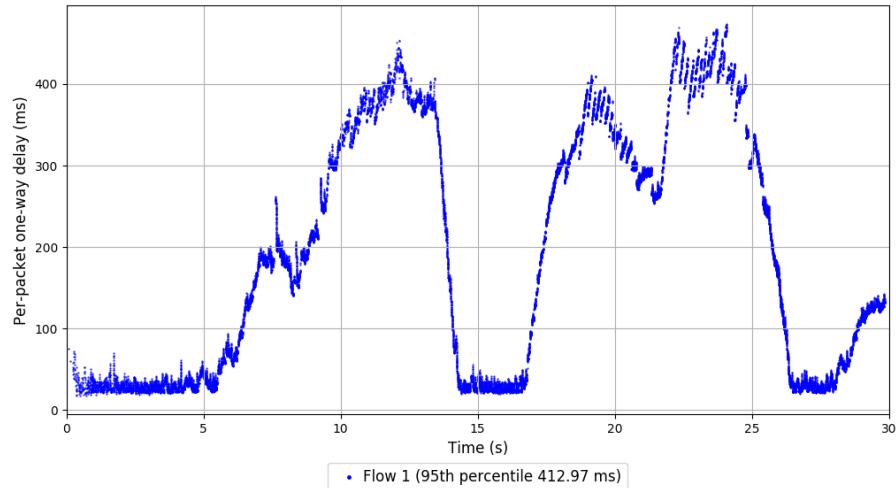
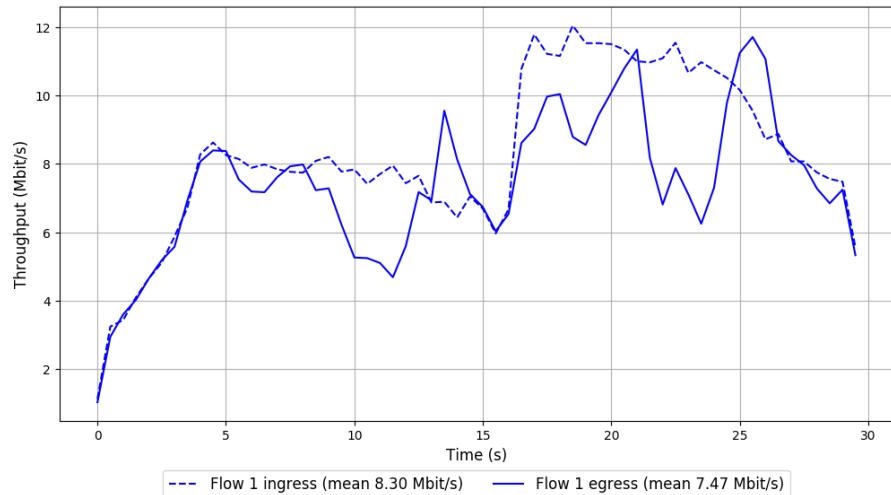


Run 2: Statistics of Vivace-LTE

```
Start at: 2018-02-19 16:52:40
End at: 2018-02-19 16:53:10
Local clock offset: 1.795 ms
Remote clock offset: -4.112 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.47 Mbit/s
95th percentile per-packet one-way delay: 412.968 ms
Loss rate: 10.28%
-- Flow 1:
Average throughput: 7.47 Mbit/s
95th percentile per-packet one-way delay: 412.968 ms
Loss rate: 10.28%
```

Run 2: Report of Vivace-LTE — Data Link



Run 3: Statistics of Vivace-LTE

```
Start at: 2018-02-19 17:16:14
End at: 2018-02-19 17:16:44
Local clock offset: 1.501 ms
Remote clock offset: -5.425 ms

# Below is generated by plot.py at 2018-02-19 18:35:57
# Datalink statistics
-- Total of 1 flow:
Average throughput: 7.12 Mbit/s
95th percentile per-packet one-way delay: 288.160 ms
Loss rate: 2.50%
-- Flow 1:
Average throughput: 7.12 Mbit/s
95th percentile per-packet one-way delay: 288.160 ms
Loss rate: 2.50%
```

Run 3: Report of Vivace-LTE — Data Link

