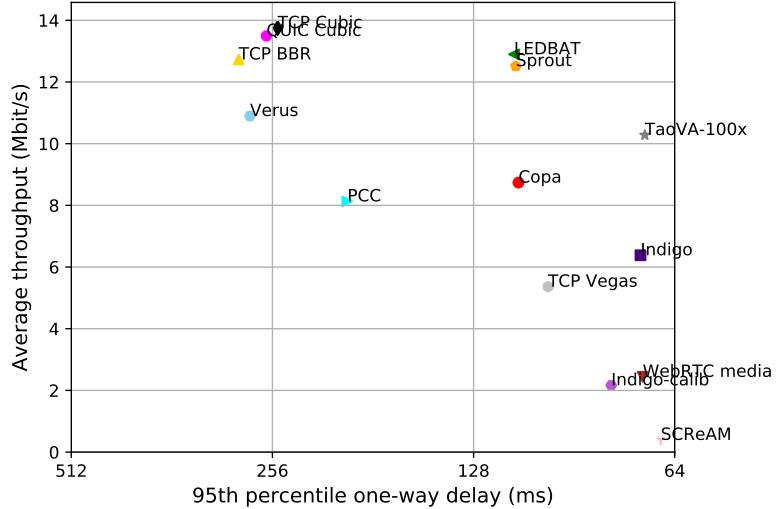


Pantheon Report

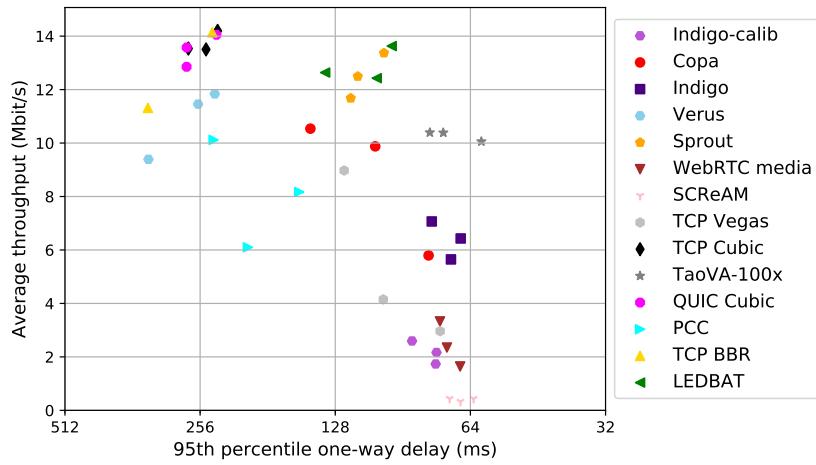
Generated at 2017-12-05 09:42:16 (UTC).
Data path: Stanford ppp0 (*remote*) → AWS California 1 Ethernet (*local*).
Repeated the test of 14 congestion control schemes 3 times.
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.
Increased UDP receive buffer to 16 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: indigos @ e3a57ad5ac5cfaca0e3f983c8dd4cc3509e0262  
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50  
M datagrump/sender.cc  
third_party/genericCC @ b5b7c38e8391001927dc41c6cfa2627d03dde737  
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55  
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2  
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89  
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c  
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5  
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fab936fdca204b80db  
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda  
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681  
M datagrump/sender.cc  
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf  
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 Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from Stanford ppp0 to AWS California 1 Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



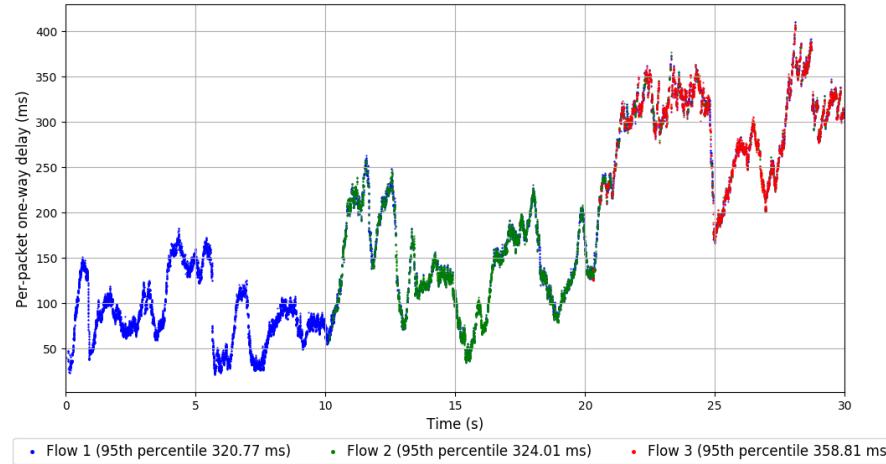
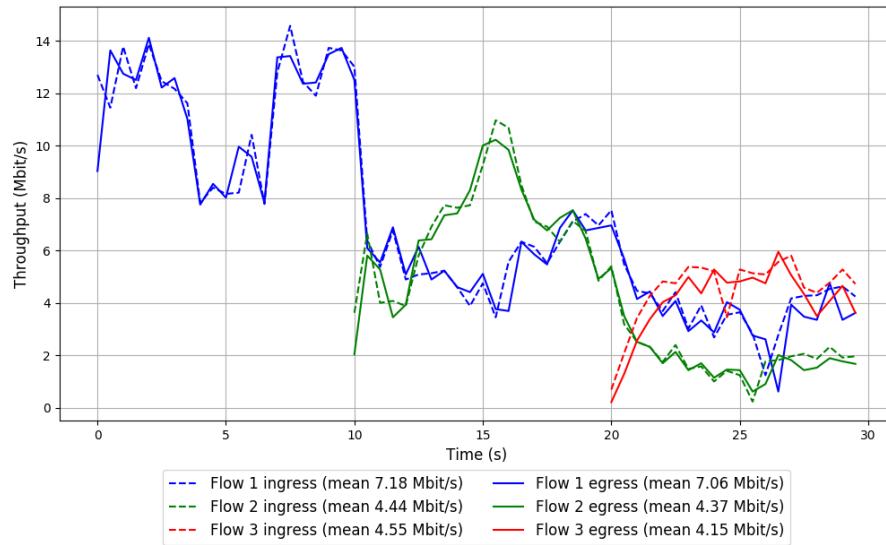
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	2	8.33	4.17	4.96	276.06	282.91	304.97	2.41	3.29	12.48
TCP Cubic	3	10.09	3.86	3.42	243.74	241.35	229.52	0.53	1.09	2.40
LEDBAT	3	8.52	4.60	4.05	112.94	108.24	96.08	0.38	0.81	1.38
PCC	3	15.78	6.52	4.67	1344.45	175.05	211.57	1.64	2.56	5.14
QUIC Cubic	3	10.50	3.04	2.99	261.01	260.42	270.48	1.39	2.29	4.00
SCReAM	3	0.19	0.20	0.22	67.37	62.13	57.20	0.19	0.33	0.61
WebRTC media	3	0.84	1.06	0.55	70.55	71.44	73.80	0.36	0.73	1.46
Sprout	3	7.45	5.69	3.96	105.32	111.76	124.34	2.01	2.09	2.69
TaoVA-100x	3	5.24	5.61	5.12	69.43	70.73	82.30	0.66	0.63	1.69
TCP Vegas	3	2.70	1.70	4.66	90.69	74.88	147.08	0.12	0.22	0.67
Verus	3	6.37	4.54	4.52	250.61	283.05	291.73	20.55	10.90	22.16
Copa	3	4.56	5.21	3.98	97.65	108.86	120.06	0.14	0.74	1.46
Indigo	3	2.76	3.88	3.15	70.80	75.23	63.04	0.26	0.21	0.40
Indigo-calib	3	0.96	0.92	1.52	83.11	95.30	72.99	0.15	0.61	0.27

Run 1: Statistics of TCP BBR

```
Start at: 2017-12-05 08:05:49
End at: 2017-12-05 08:06:19
Local clock offset: 3.269 ms
Remote clock offset: -2.708 ms

# Below is generated by plot.py at 2017-12-05 09:41:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.32 Mbit/s
95th percentile per-packet one-way delay: 334.600 ms
Loss rate: 2.90%
-- Flow 1:
Average throughput: 7.06 Mbit/s
95th percentile per-packet one-way delay: 320.771 ms
Loss rate: 1.77%
-- Flow 2:
Average throughput: 4.37 Mbit/s
95th percentile per-packet one-way delay: 324.012 ms
Loss rate: 1.98%
-- Flow 3:
Average throughput: 4.15 Mbit/s
95th percentile per-packet one-way delay: 358.806 ms
Loss rate: 10.12%
```

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-12-05 08:22:29
End at: 2017-12-05 08:22:59
Local clock offset: 3.257 ms
Remote clock offset: -2.438 ms

Run 2: Report of TCP BBR — Data Link

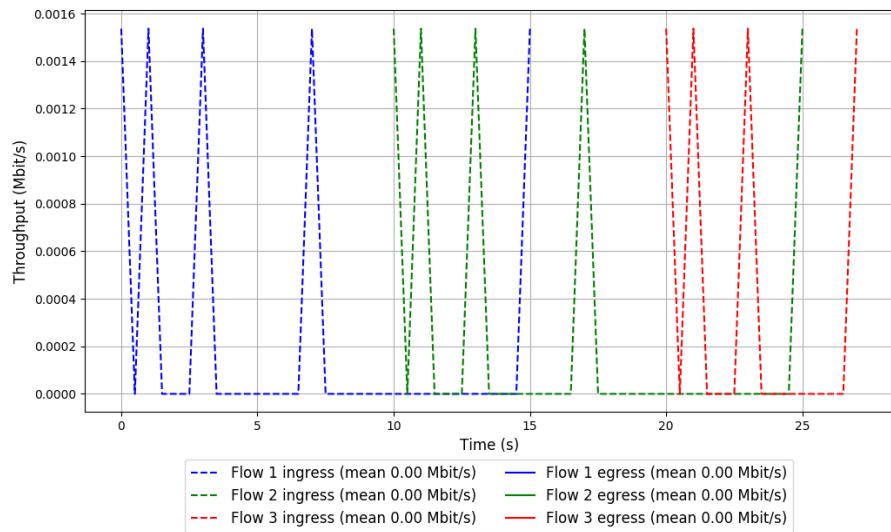


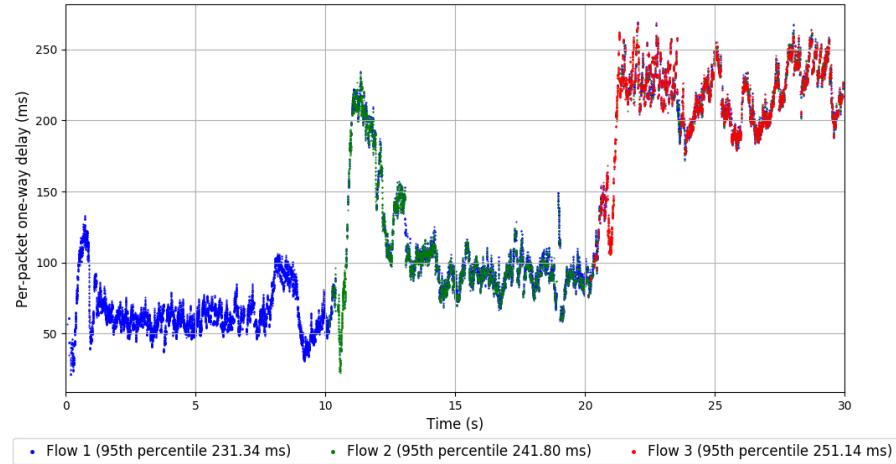
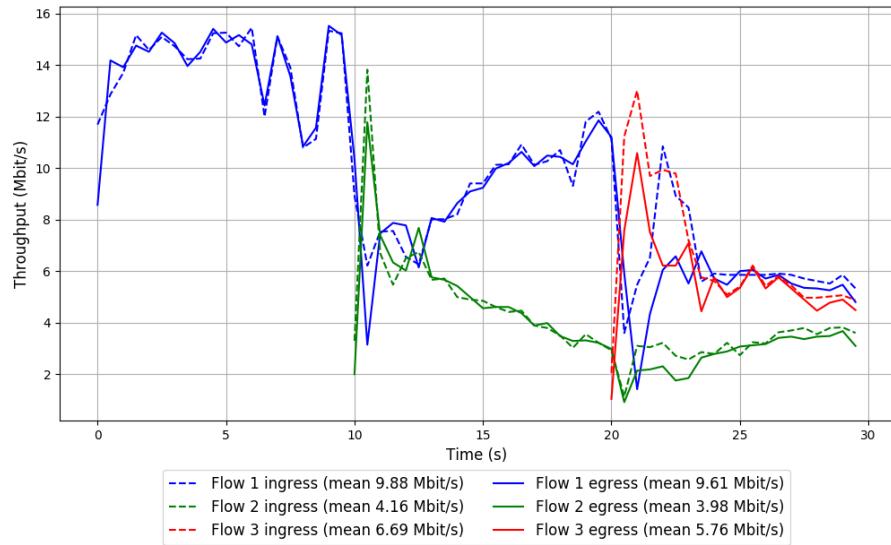
Figure is missing

Run 3: Statistics of TCP BBR

```
Start at: 2017-12-05 08:39:07
End at: 2017-12-05 08:39:37
Local clock offset: 3.253 ms
Remote clock offset: -2.5 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.14 Mbit/s
95th percentile per-packet one-way delay: 240.530 ms
Loss rate: 5.10%
-- Flow 1:
Average throughput: 9.61 Mbit/s
95th percentile per-packet one-way delay: 231.343 ms
Loss rate: 3.05%
-- Flow 2:
Average throughput: 3.98 Mbit/s
95th percentile per-packet one-way delay: 241.803 ms
Loss rate: 4.61%
-- Flow 3:
Average throughput: 5.76 Mbit/s
95th percentile per-packet one-way delay: 251.141 ms
Loss rate: 14.85%
```

Run 3: Report of TCP BBR — Data Link

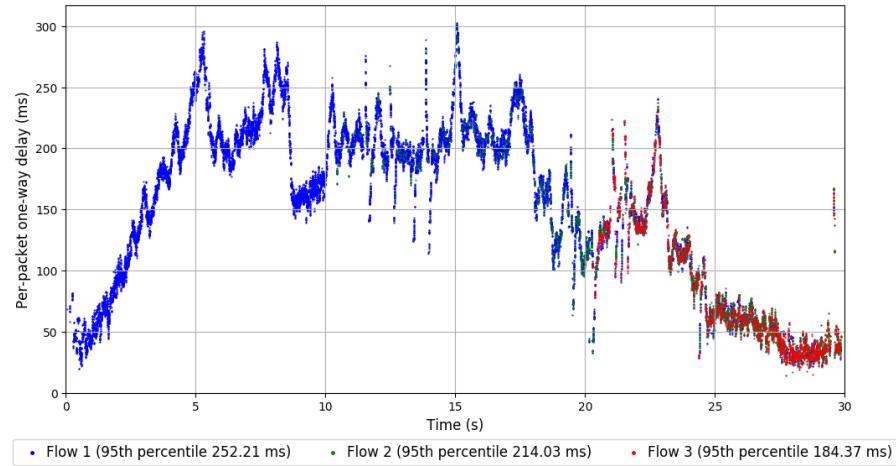
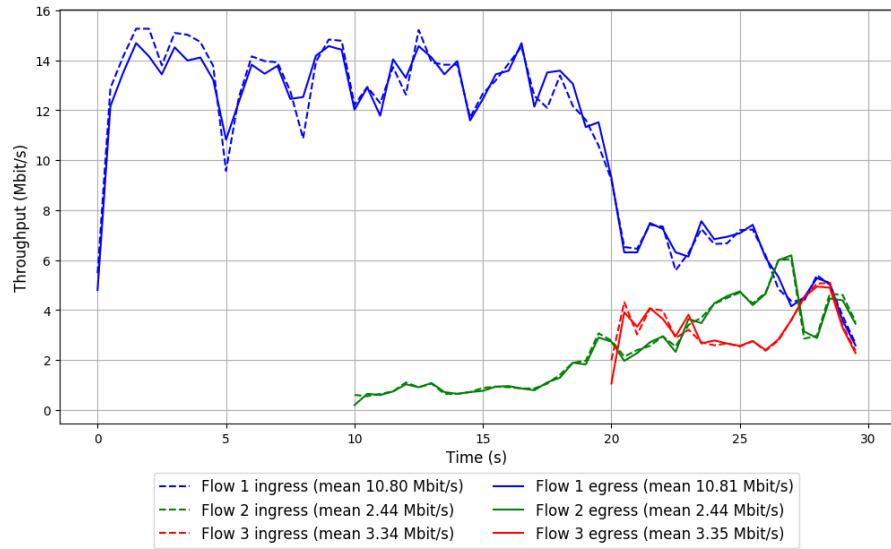


Run 1: Statistics of TCP Cubic

```
Start at: 2017-12-05 08:09:23
End at: 2017-12-05 08:09:53
Local clock offset: 3.197 ms
Remote clock offset: -2.613 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.50 Mbit/s
95th percentile per-packet one-way delay: 248.346 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 10.81 Mbit/s
95th percentile per-packet one-way delay: 252.210 ms
Loss rate: 0.42%
-- Flow 2:
Average throughput: 2.44 Mbit/s
95th percentile per-packet one-way delay: 214.028 ms
Loss rate: 1.41%
-- Flow 3:
Average throughput: 3.35 Mbit/s
95th percentile per-packet one-way delay: 184.374 ms
Loss rate: 1.35%
```

Run 1: Report of TCP Cubic — Data Link

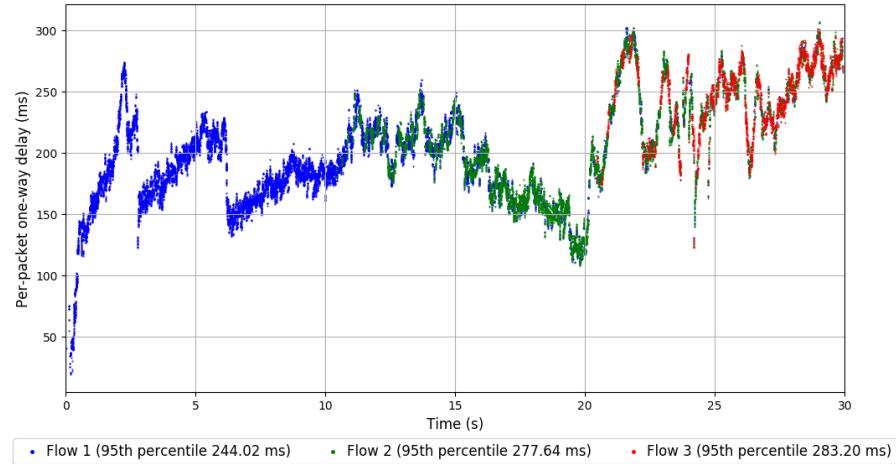
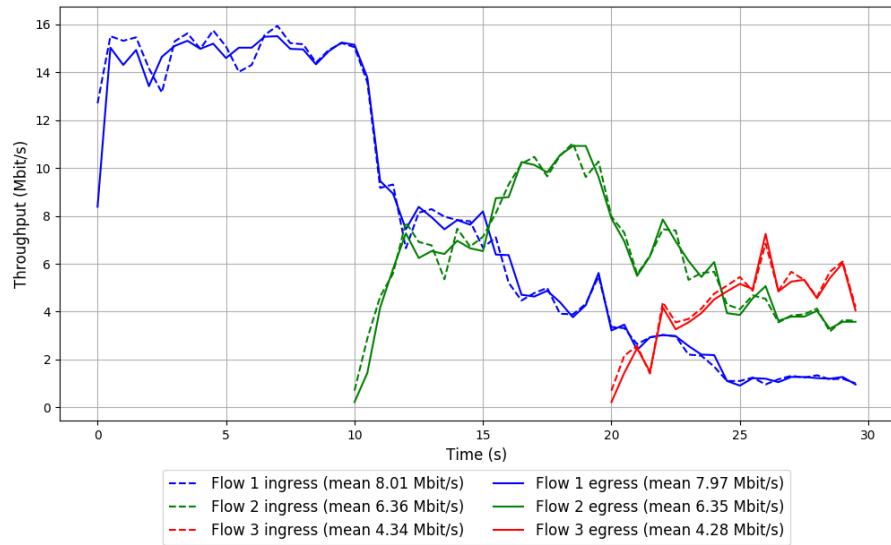


Run 2: Statistics of TCP Cubic

```
Start at: 2017-12-05 08:26:03
End at: 2017-12-05 08:26:33
Local clock offset: 3.205 ms
Remote clock offset: -2.406 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.54 Mbit/s
95th percentile per-packet one-way delay: 271.879 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 7.97 Mbit/s
95th percentile per-packet one-way delay: 244.019 ms
Loss rate: 0.71%
-- Flow 2:
Average throughput: 6.35 Mbit/s
95th percentile per-packet one-way delay: 277.645 ms
Loss rate: 1.19%
-- Flow 3:
Average throughput: 4.28 Mbit/s
95th percentile per-packet one-way delay: 283.197 ms
Loss rate: 3.85%
```

Run 2: Report of TCP Cubic — Data Link

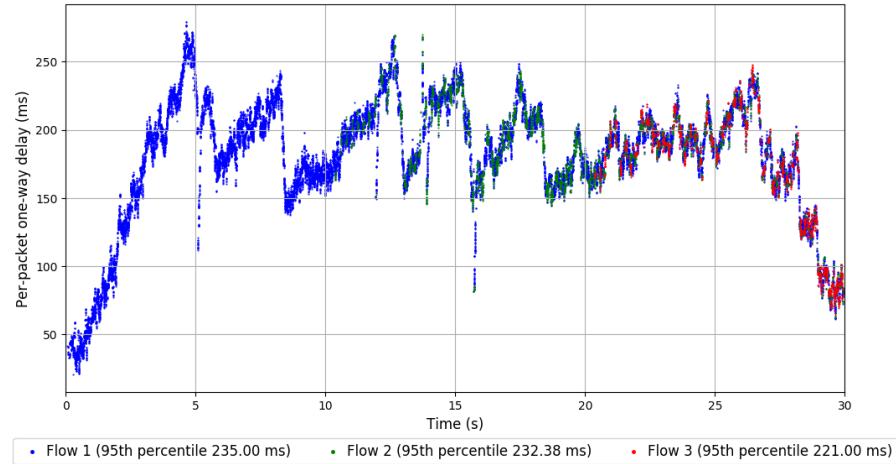
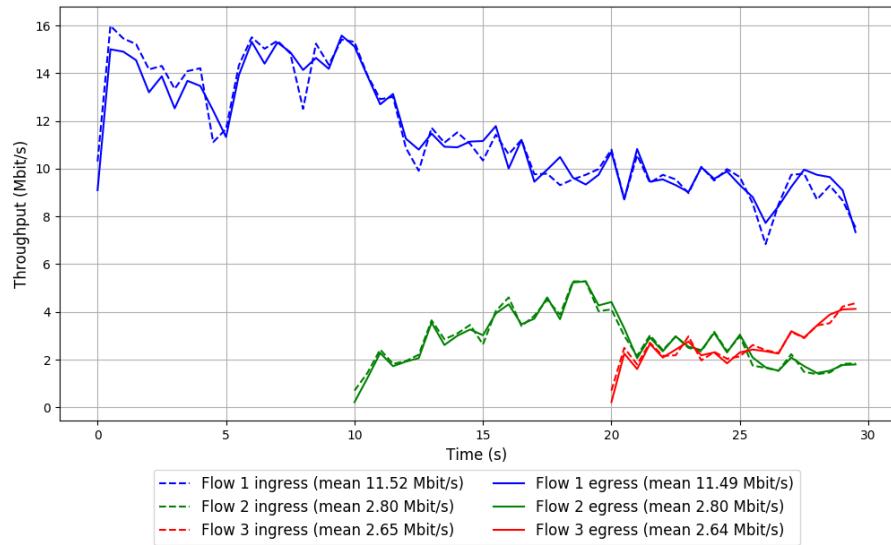


Run 3: Statistics of TCP Cubic

```
Start at: 2017-12-05 08:42:42
End at: 2017-12-05 08:43:12
Local clock offset: 3.296 ms
Remote clock offset: -2.529 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.20 Mbit/s
95th percentile per-packet one-way delay: 234.049 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 11.49 Mbit/s
95th percentile per-packet one-way delay: 234.999 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 232.384 ms
Loss rate: 0.67%
-- Flow 3:
Average throughput: 2.64 Mbit/s
95th percentile per-packet one-way delay: 220.998 ms
Loss rate: 2.01%
```

Run 3: Report of TCP Cubic — Data Link

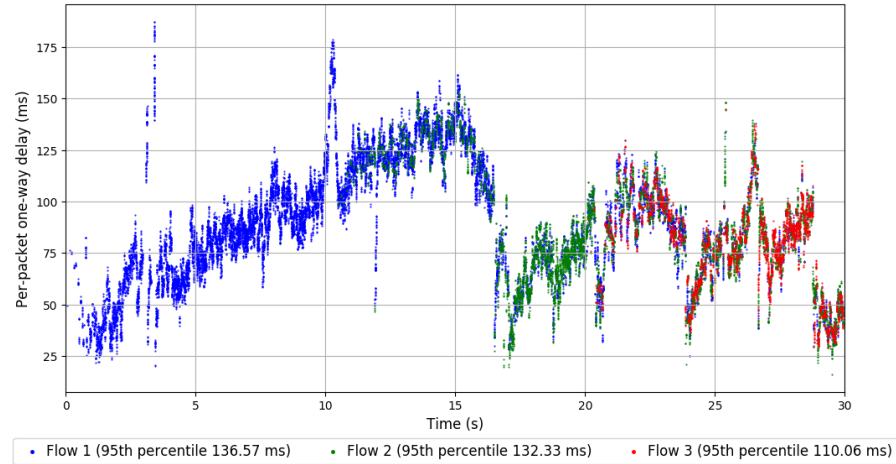
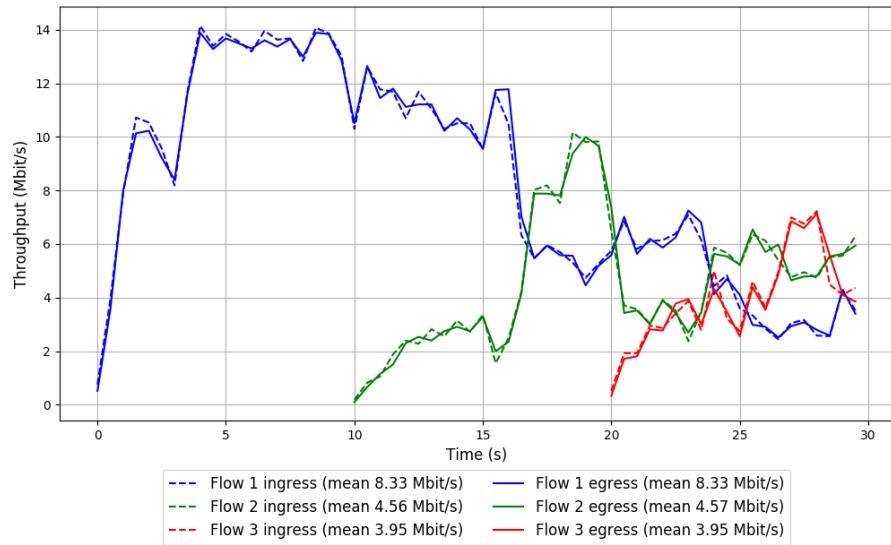


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2017-12-05 08:08:11
End at: 2017-12-05 08:08:41
Local clock offset: 3.268 ms
Remote clock offset: -2.64 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.64 Mbit/s
95th percentile per-packet one-way delay: 134.820 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 8.33 Mbit/s
95th percentile per-packet one-way delay: 136.572 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 132.333 ms
Loss rate: 0.72%
-- Flow 3:
Average throughput: 3.95 Mbit/s
95th percentile per-packet one-way delay: 110.059 ms
Loss rate: 1.17%
```

Run 1: Report of LEDBAT — Data Link

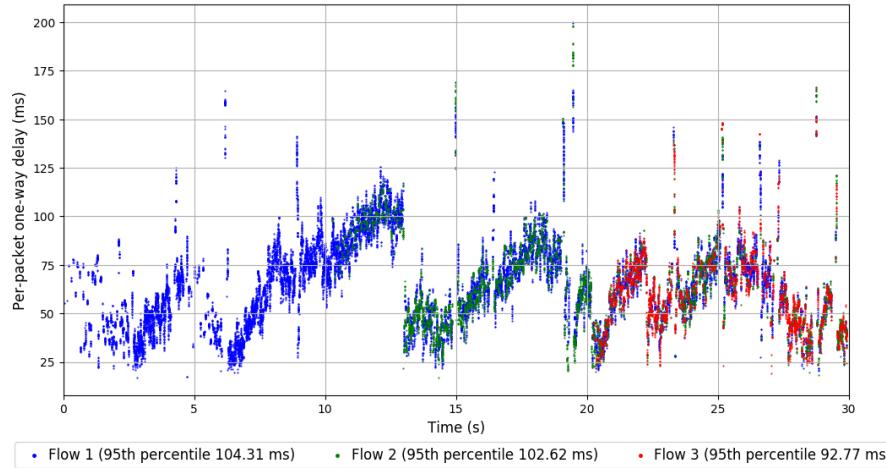
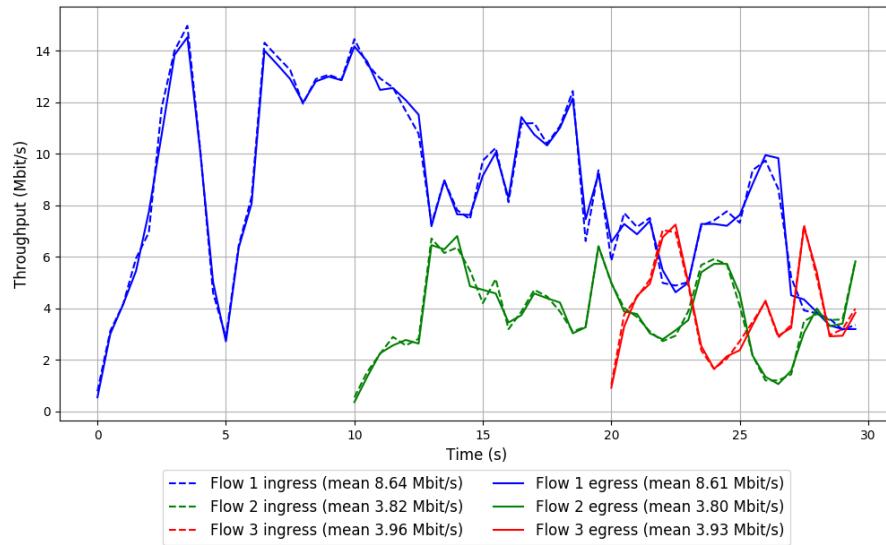


Run 2: Statistics of LEDBAT

```
Start at: 2017-12-05 08:24:51
End at: 2017-12-05 08:25:21
Local clock offset: 3.183 ms
Remote clock offset: -2.403 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.43 Mbit/s
95th percentile per-packet one-way delay: 103.482 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 8.61 Mbit/s
95th percentile per-packet one-way delay: 104.308 ms
Loss rate: 0.58%
-- Flow 2:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 102.625 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 3.93 Mbit/s
95th percentile per-packet one-way delay: 92.773 ms
Loss rate: 1.44%
```

Run 2: Report of LEDBAT — Data Link

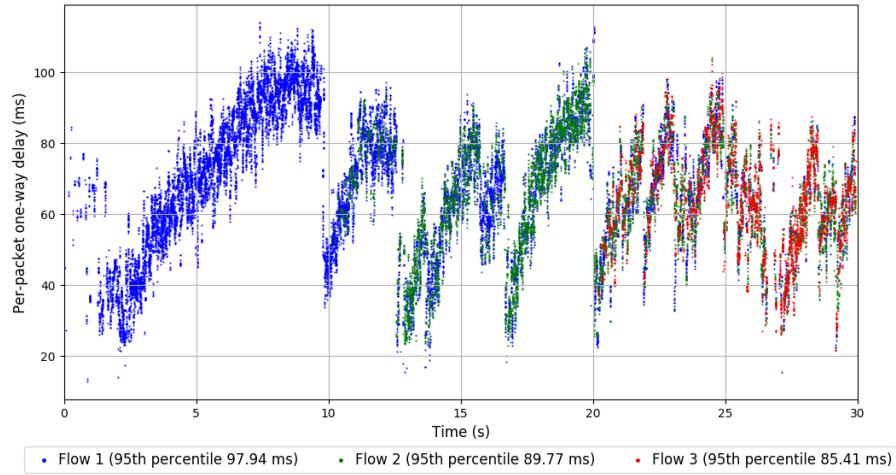
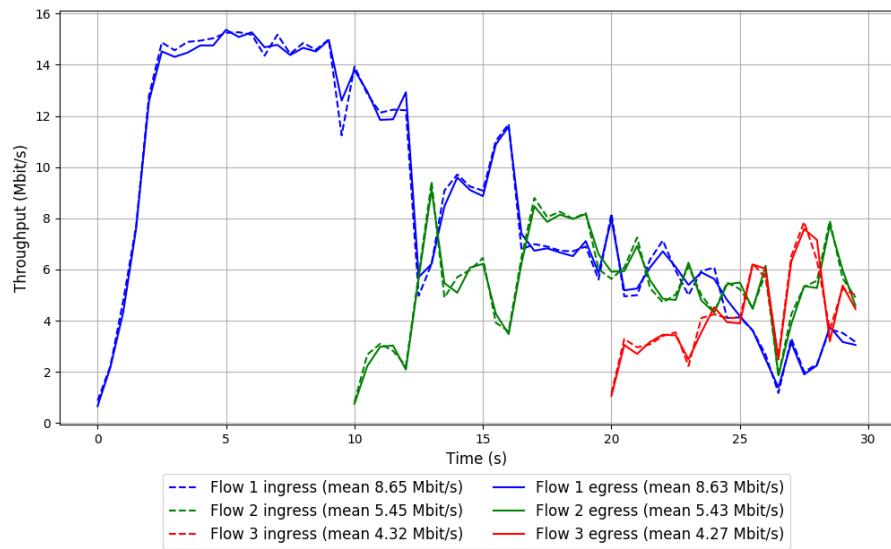


Run 3: Statistics of LEDBAT

```
Start at: 2017-12-05 08:41:30
End at: 2017-12-05 08:42:00
Local clock offset: 3.318 ms
Remote clock offset: -2.546 ms

# Below is generated by plot.py at 2017-12-05 09:41:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.63 Mbit/s
95th percentile per-packet one-way delay: 95.839 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 8.63 Mbit/s
95th percentile per-packet one-way delay: 97.943 ms
Loss rate: 0.37%
-- Flow 2:
Average throughput: 5.43 Mbit/s
95th percentile per-packet one-way delay: 89.768 ms
Loss rate: 0.76%
-- Flow 3:
Average throughput: 4.27 Mbit/s
95th percentile per-packet one-way delay: 85.411 ms
Loss rate: 1.54%
```

Run 3: Report of LEDBAT — Data Link

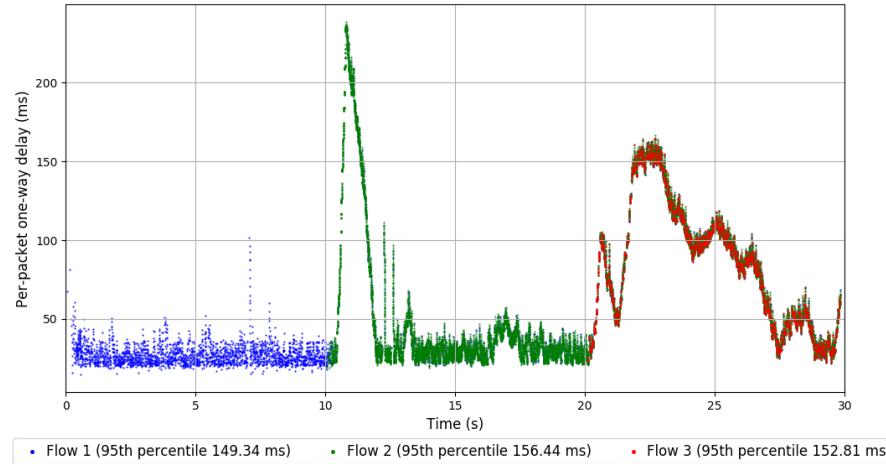
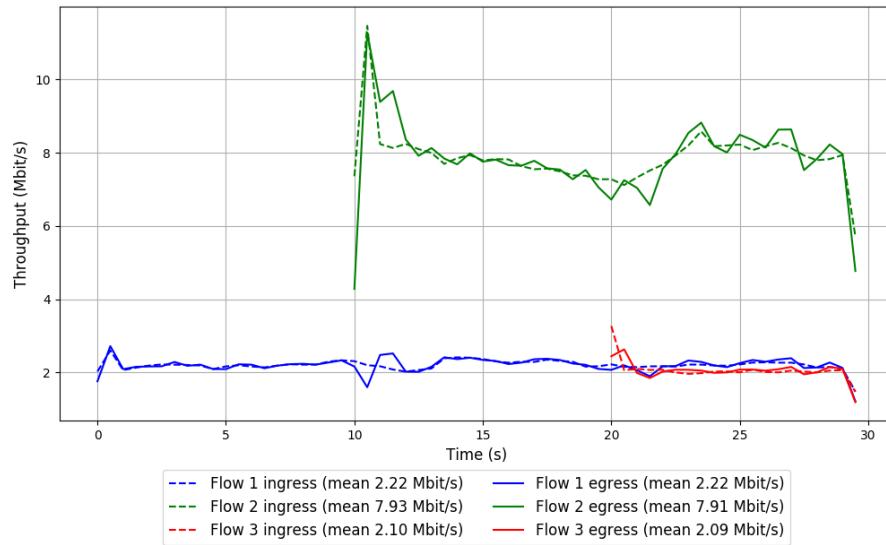


Run 1: Statistics of PCC

```
Start at: 2017-12-05 08:14:08
End at: 2017-12-05 08:14:38
Local clock offset: 3.169 ms
Remote clock offset: -2.56 ms

# Below is generated by plot.py at 2017-12-05 09:41:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.17 Mbit/s
95th percentile per-packet one-way delay: 154.006 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 149.341 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 7.91 Mbit/s
95th percentile per-packet one-way delay: 156.445 ms
Loss rate: 0.44%
-- Flow 3:
Average throughput: 2.09 Mbit/s
95th percentile per-packet one-way delay: 152.808 ms
Loss rate: 0.89%
```

Run 1: Report of PCC — Data Link

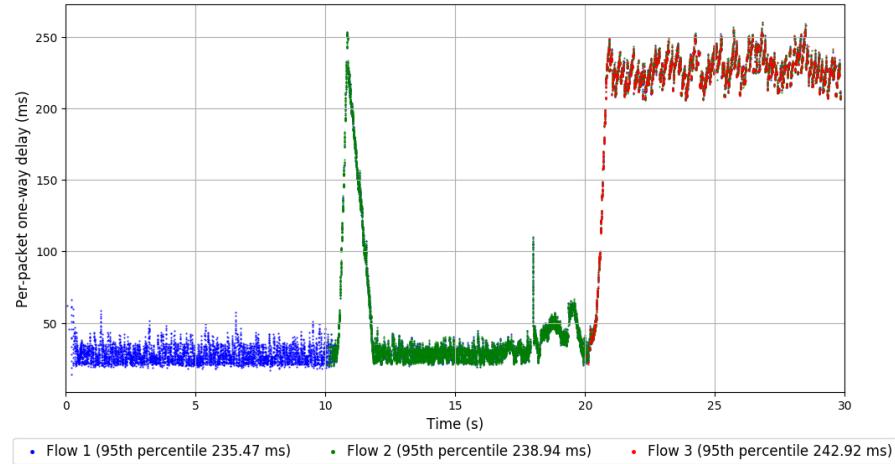
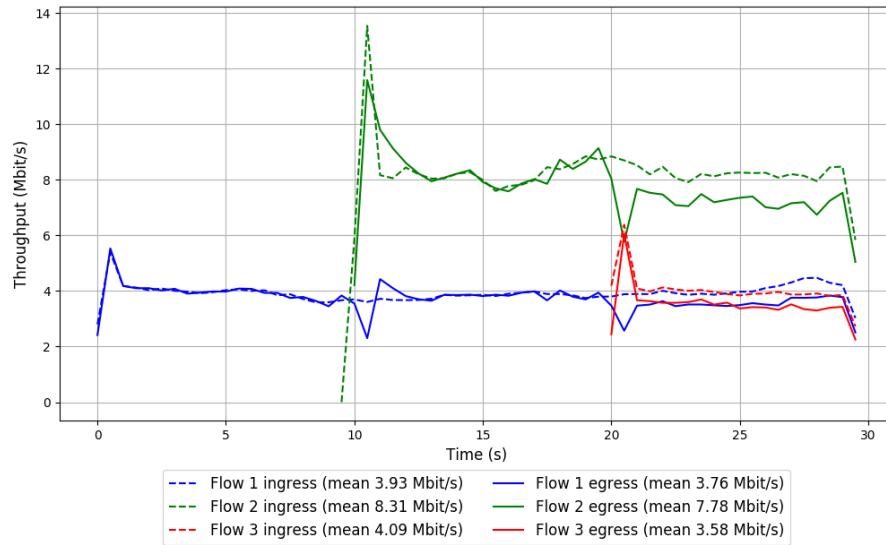


Run 2: Statistics of PCC

```
Start at: 2017-12-05 08:30:48
End at: 2017-12-05 08:31:18
Local clock offset: 3.292 ms
Remote clock offset: -2.381 ms

# Below is generated by plot.py at 2017-12-05 09:41:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.12 Mbit/s
95th percentile per-packet one-way delay: 238.826 ms
Loss rate: 6.69%
-- Flow 1:
Average throughput: 3.76 Mbit/s
95th percentile per-packet one-way delay: 235.471 ms
Loss rate: 4.63%
-- Flow 2:
Average throughput: 7.78 Mbit/s
95th percentile per-packet one-way delay: 238.941 ms
Loss rate: 6.65%
-- Flow 3:
Average throughput: 3.58 Mbit/s
95th percentile per-packet one-way delay: 242.917 ms
Loss rate: 12.82%
```

Run 2: Report of PCC — Data Link

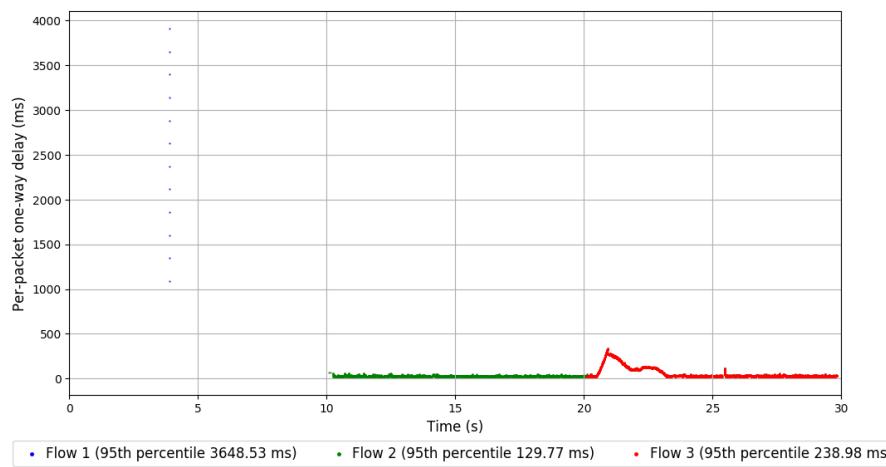
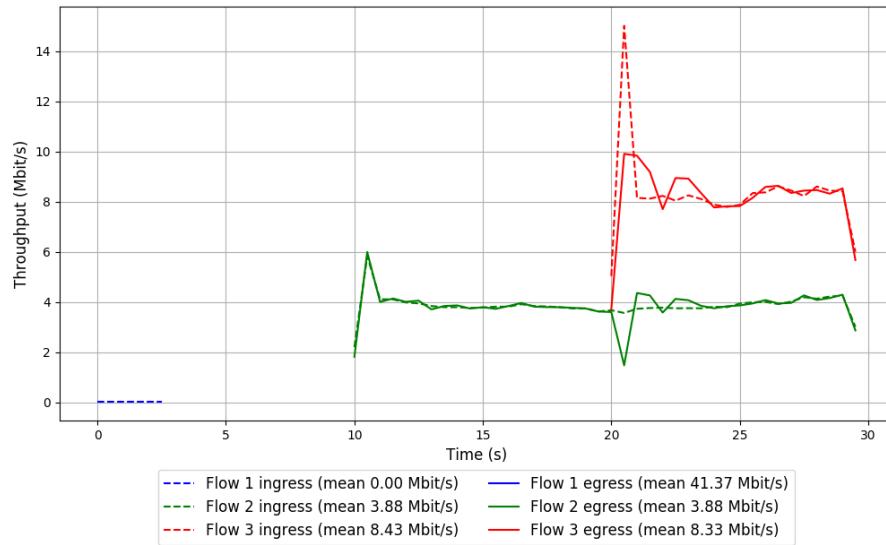


Run 3: Statistics of PCC

```
Start at: 2017-12-05 08:47:28
End at: 2017-12-05 08:47:58
Local clock offset: 3.172 ms
Remote clock offset: -2.6 ms

# Below is generated by plot.py at 2017-12-05 09:41:33
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.10 Mbit/s
95th percentile per-packet one-way delay: 200.360 ms
Loss rate: 1.17%
-- Flow 1:
Average throughput: 41.37 Mbit/s
95th percentile per-packet one-way delay: 3648.525 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 3.88 Mbit/s
95th percentile per-packet one-way delay: 129.768 ms
Loss rate: 0.58%
-- Flow 3:
Average throughput: 8.33 Mbit/s
95th percentile per-packet one-way delay: 238.979 ms
Loss rate: 1.72%
```

Run 3: Report of PCC — Data Link

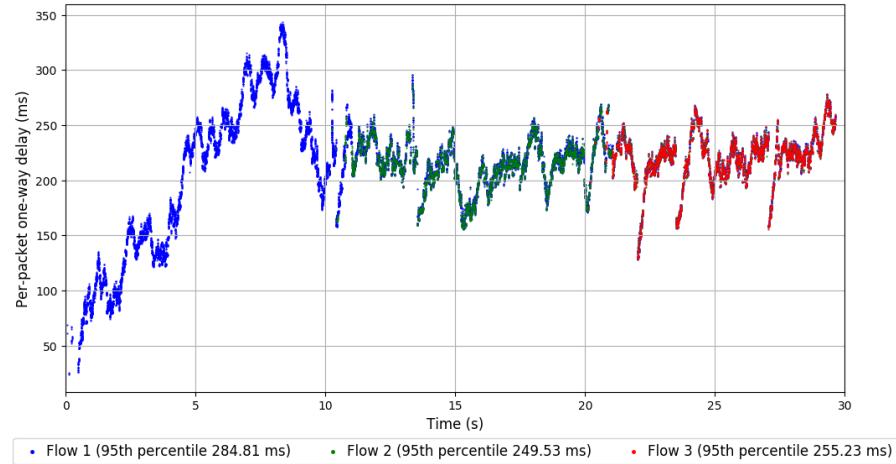
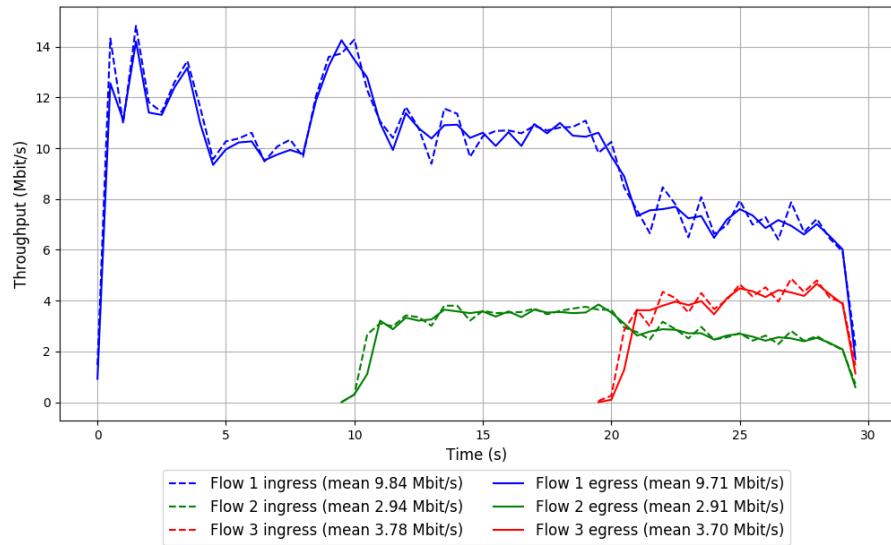


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2017-12-05 08:11:46
End at: 2017-12-05 08:12:16
Local clock offset: 3.272 ms
Remote clock offset: -2.581 ms

# Below is generated by plot.py at 2017-12-05 09:41:37
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.85 Mbit/s
95th percentile per-packet one-way delay: 274.356 ms
Loss rate: 1.87%
-- Flow 1:
Average throughput: 9.71 Mbit/s
95th percentile per-packet one-way delay: 284.815 ms
Loss rate: 1.55%
-- Flow 2:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 249.534 ms
Loss rate: 2.15%
-- Flow 3:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 255.233 ms
Loss rate: 3.95%
```

Run 1: Report of QUIC Cubic — Data Link

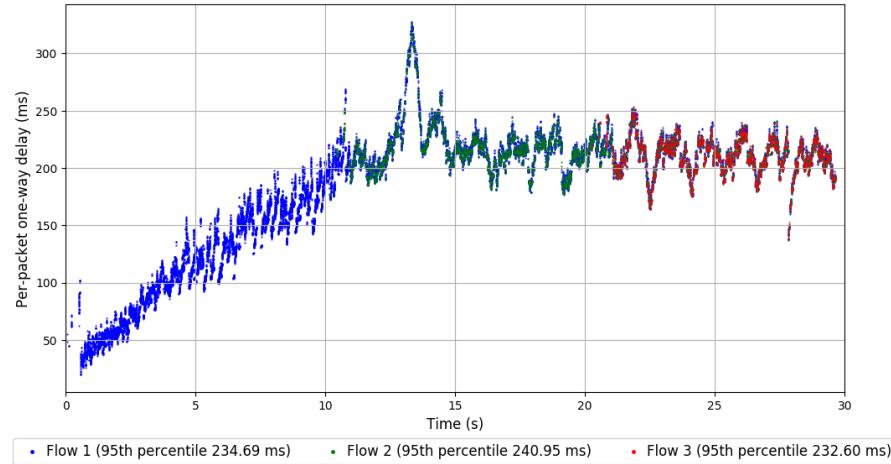
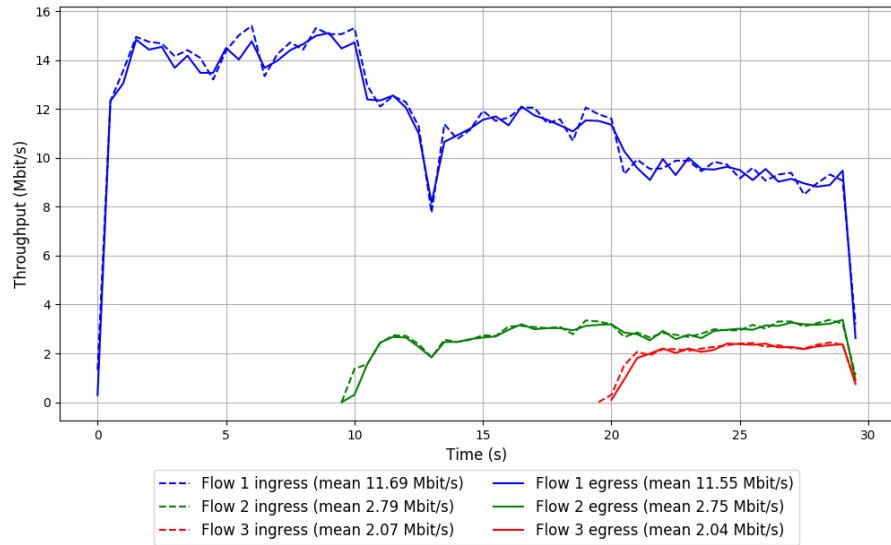


Run 2: Statistics of QUIC Cubic

```
Start at: 2017-12-05 08:28:25
End at: 2017-12-05 08:28:55
Local clock offset: 3.233 ms
Remote clock offset: -2.407 ms

# Below is generated by plot.py at 2017-12-05 09:41:38
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.05 Mbit/s
95th percentile per-packet one-way delay: 235.389 ms
Loss rate: 1.58%
-- Flow 1:
Average throughput: 11.55 Mbit/s
95th percentile per-packet one-way delay: 234.693 ms
Loss rate: 1.35%
-- Flow 2:
Average throughput: 2.75 Mbit/s
95th percentile per-packet one-way delay: 240.948 ms
Loss rate: 2.26%
-- Flow 3:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 232.597 ms
Loss rate: 3.60%
```

Run 2: Report of QUIC Cubic — Data Link

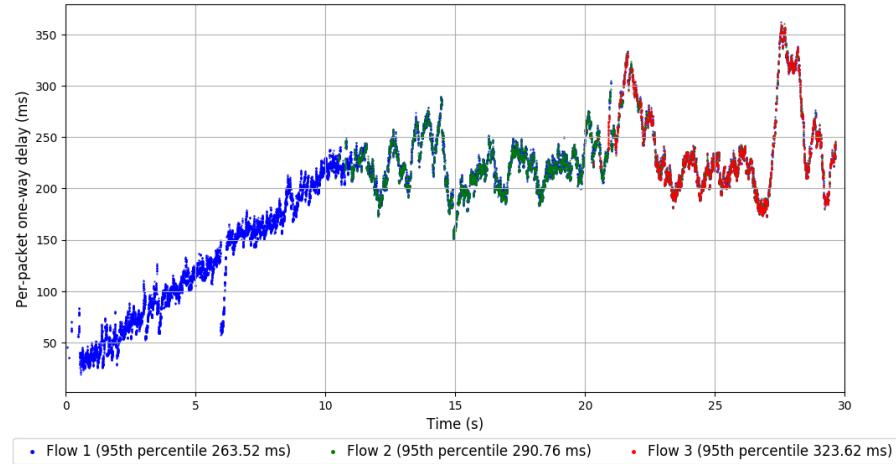
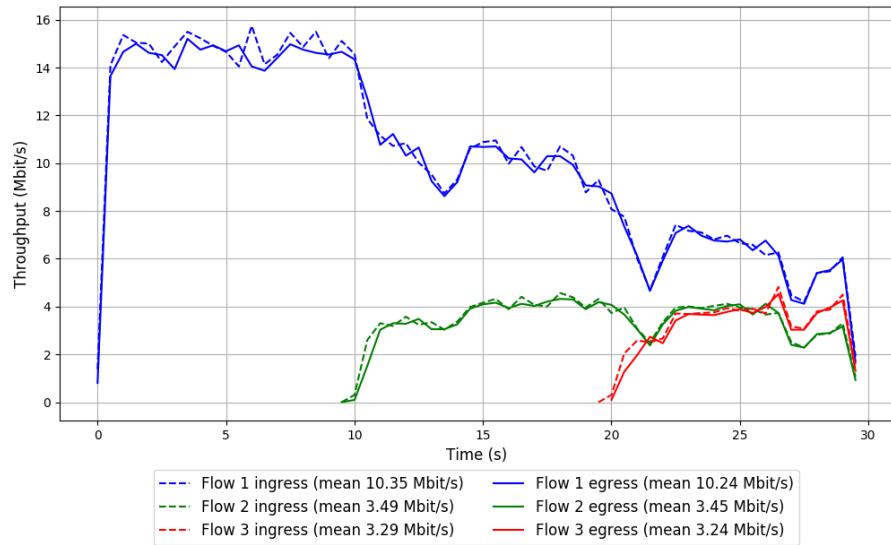


Run 3: Statistics of QUIC Cubic

```
Start at: 2017-12-05 08:45:05
End at: 2017-12-05 08:45:35
Local clock offset: 3.169 ms
Remote clock offset: -2.58 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.58 Mbit/s
95th percentile per-packet one-way delay: 274.201 ms
Loss rate: 1.72%
-- Flow 1:
Average throughput: 10.24 Mbit/s
95th percentile per-packet one-way delay: 263.522 ms
Loss rate: 1.27%
-- Flow 2:
Average throughput: 3.45 Mbit/s
95th percentile per-packet one-way delay: 290.764 ms
Loss rate: 2.46%
-- Flow 3:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 323.618 ms
Loss rate: 4.45%
```

Run 3: Report of QUIC Cubic — Data Link

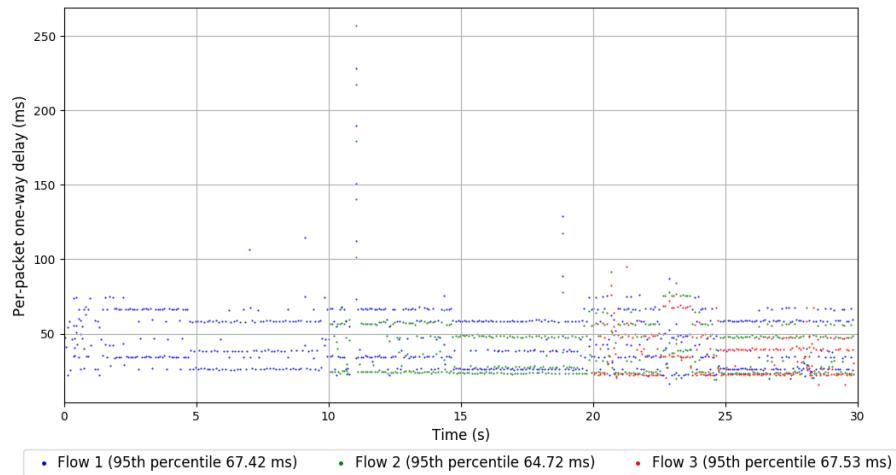
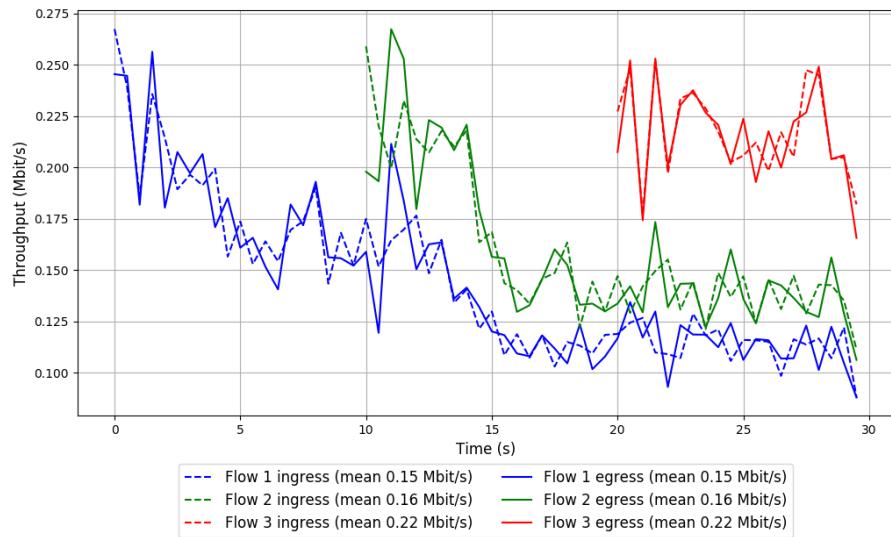


Run 1: Statistics of SCReAM

```
Start at: 2017-12-05 08:04:37
End at: 2017-12-05 08:05:07
Local clock offset: 3.427 ms
Remote clock offset: -2.761 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 67.334 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 67.417 ms
Loss rate: 0.20%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 64.715 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 67.533 ms
Loss rate: 0.74%
```

Run 1: Report of SCReAM — Data Link

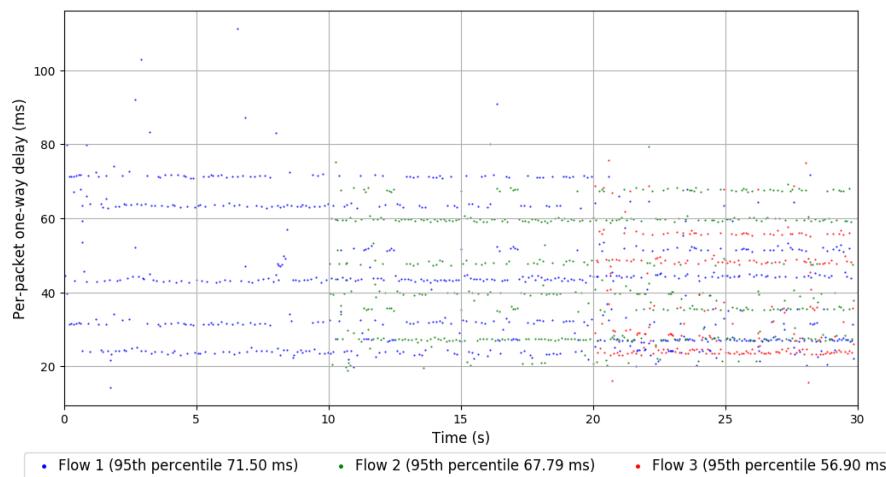
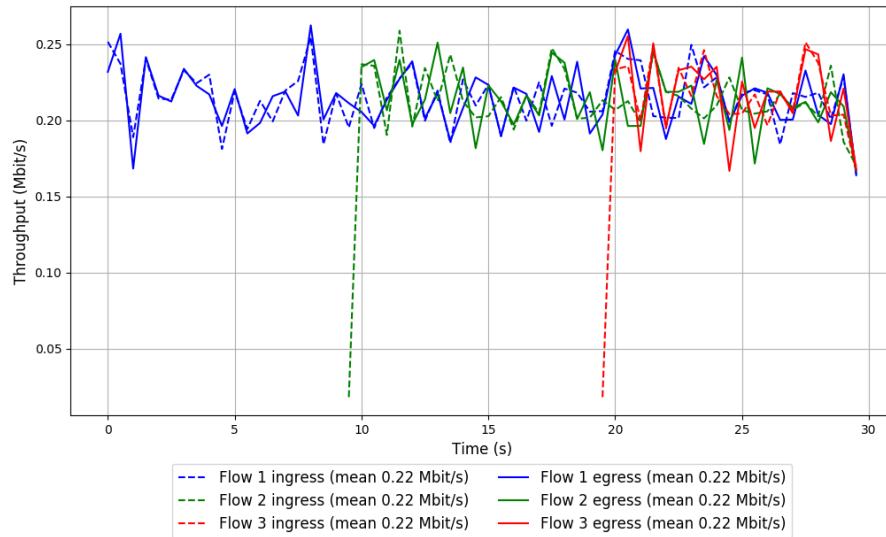


Run 2: Statistics of SCReAM

```
Start at: 2017-12-05 08:21:17
End at: 2017-12-05 08:21:47
Local clock offset: 3.261 ms
Remote clock offset: -2.46 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 71.181 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 71.502 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 67.786 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 56.900 ms
Loss rate: 0.35%
```

Run 2: Report of SCReAM — Data Link

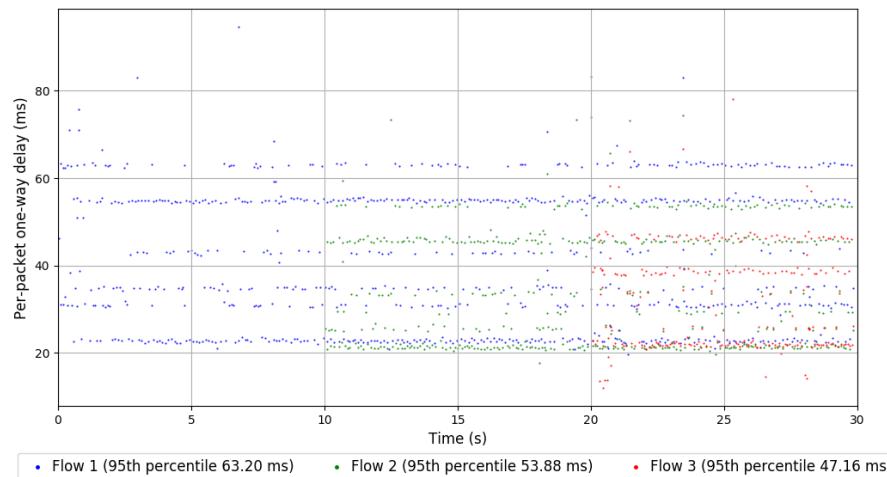
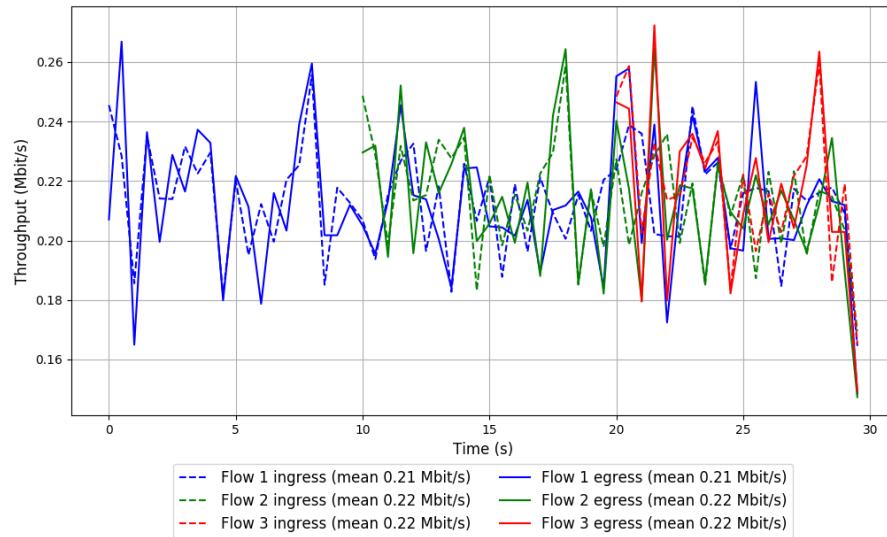


Run 3: Statistics of SCReAM

```
Start at: 2017-12-05 08:37:56
End at: 2017-12-05 08:38:26
Local clock offset: 3.272 ms
Remote clock offset: -2.416 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 62.959 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 63.202 ms
Loss rate: 0.25%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 53.880 ms
Loss rate: 0.42%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 47.158 ms
Loss rate: 0.73%
```

Run 3: Report of SCReAM — Data Link

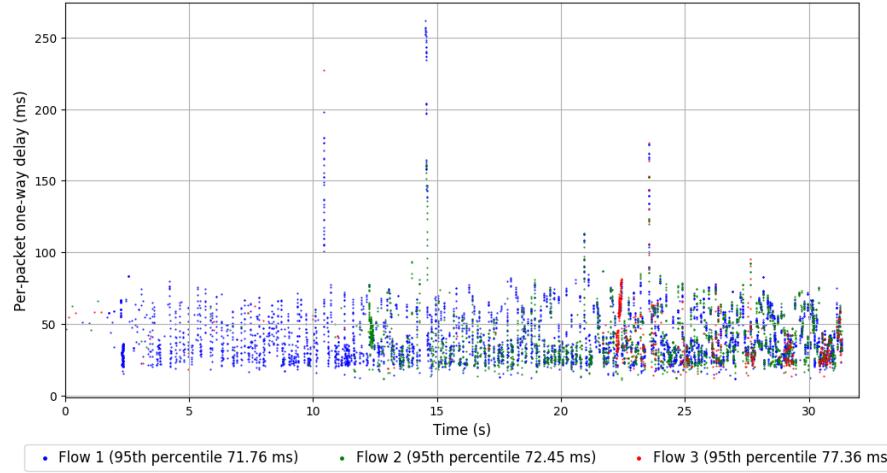
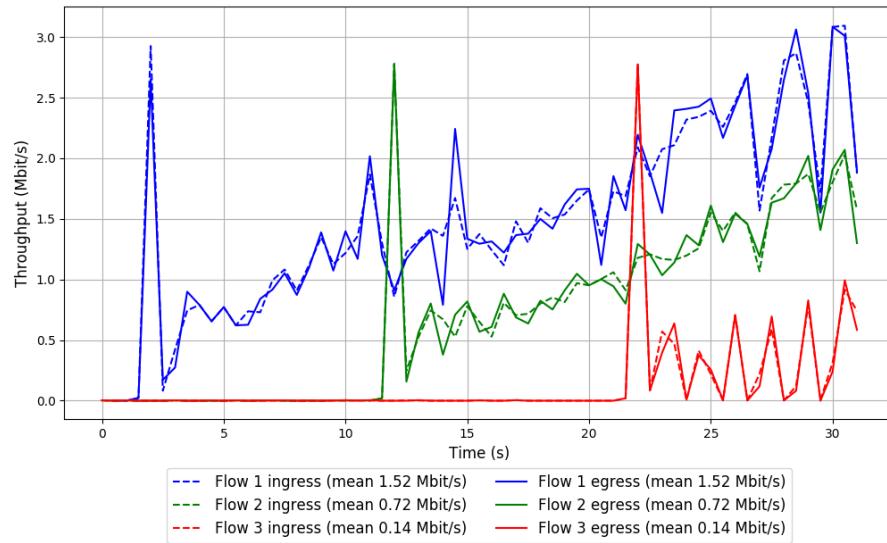


```
Run 1: Statistics of WebRTC media

Start at: 2017-12-05 08:01:03
End at: 2017-12-05 08:01:33
Local clock offset: 3.512 ms
Remote clock offset: -2.751 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.35 Mbit/s
95th percentile per-packet one-way delay: 72.186 ms
Loss rate: 0.57%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 71.764 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 72.446 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 77.363 ms
Loss rate: 1.73%
```

Run 1: Report of WebRTC media — Data Link

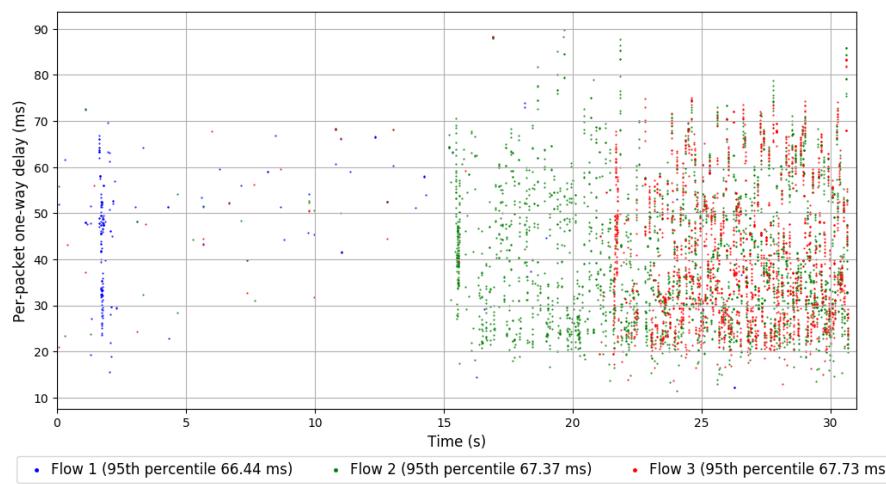
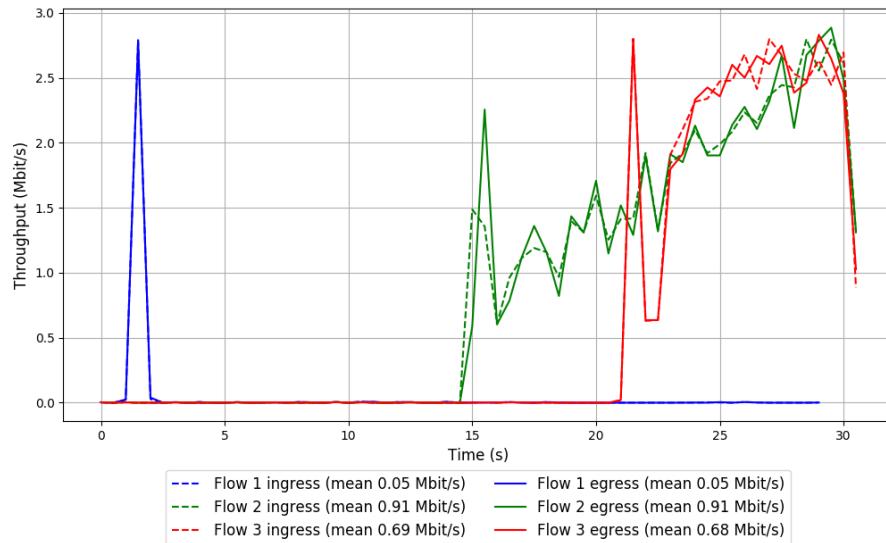


Run 2: Statistics of WebRTC media

```
Start at: 2017-12-05 08:17:43
End at: 2017-12-05 08:18:13
Local clock offset: 3.158 ms
Remote clock offset: -2.531 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 67.453 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 66.440 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 67.369 ms
Loss rate: 0.40%
-- Flow 3:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 67.730 ms
Loss rate: 0.42%
```

Run 2: Report of WebRTC media — Data Link

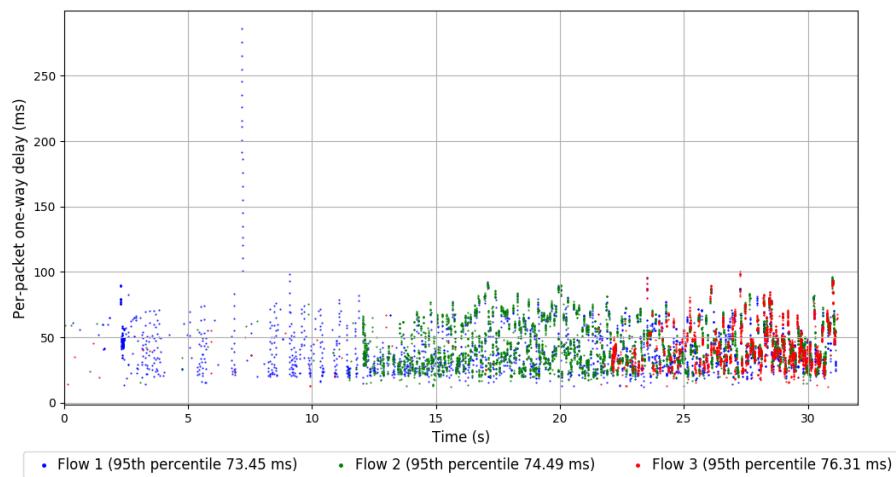
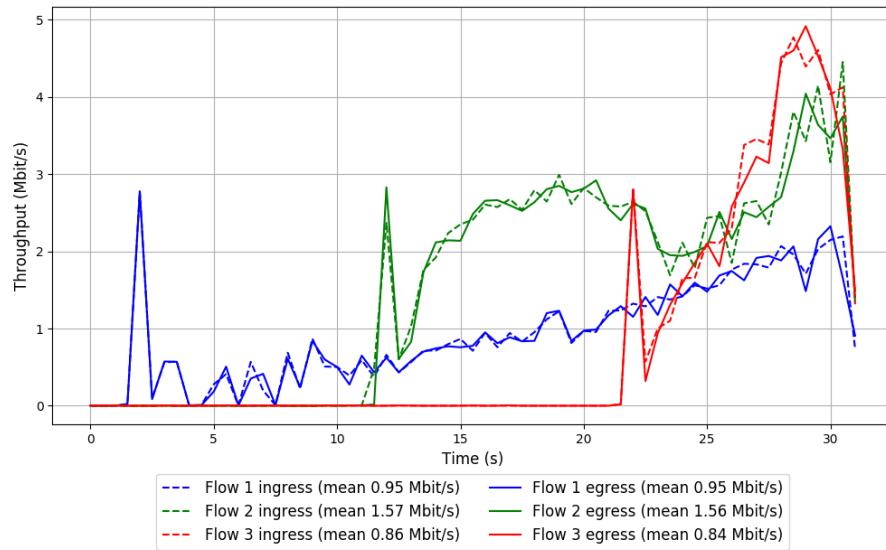


Run 3: Statistics of WebRTC media

```
Start at: 2017-12-05 08:34:22
End at: 2017-12-05 08:34:52
Local clock offset: 3.332 ms
Remote clock offset: -2.501 ms

# Below is generated by plot.py at 2017-12-05 09:41:39
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.33 Mbit/s
95th percentile per-packet one-way delay: 74.813 ms
Loss rate: 1.29%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 73.452 ms
Loss rate: 0.63%
-- Flow 2:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 74.490 ms
Loss rate: 1.18%
-- Flow 3:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 76.310 ms
Loss rate: 2.23%
```

Run 3: Report of WebRTC media — Data Link

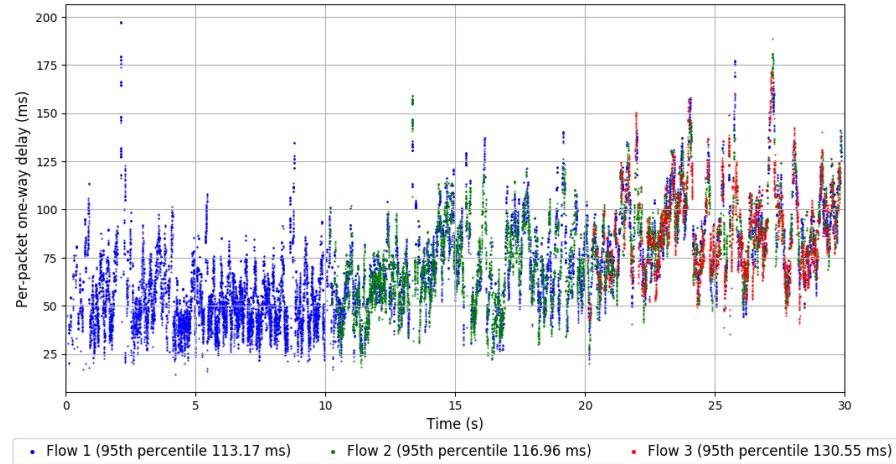
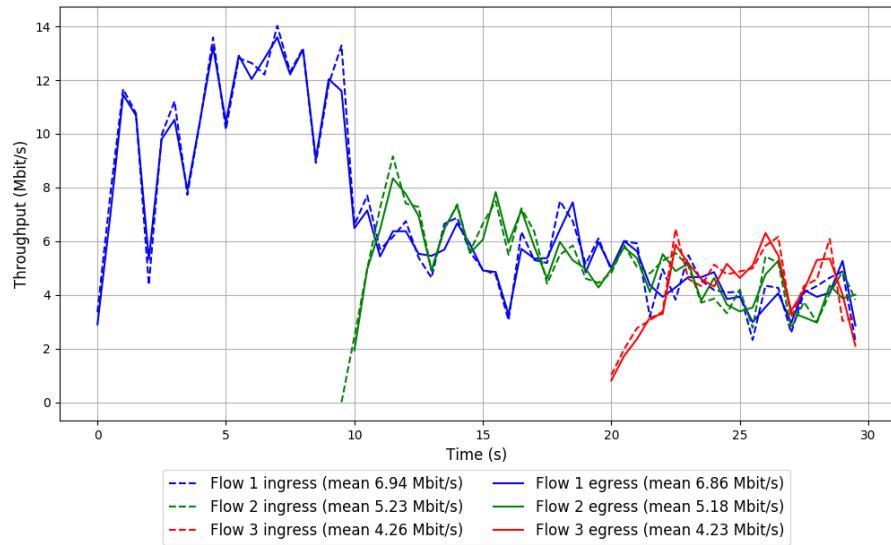


Run 1: Statistics of Sprout

```
Start at: 2017-12-05 08:03:26
End at: 2017-12-05 08:03:56
Local clock offset: 3.467 ms
Remote clock offset: -2.797 ms

# Below is generated by plot.py at 2017-12-05 09:41:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.68 Mbit/s
95th percentile per-packet one-way delay: 118.245 ms
Loss rate: 1.31%
-- Flow 1:
Average throughput: 6.86 Mbit/s
95th percentile per-packet one-way delay: 113.174 ms
Loss rate: 1.21%
-- Flow 2:
Average throughput: 5.18 Mbit/s
95th percentile per-packet one-way delay: 116.960 ms
Loss rate: 1.39%
-- Flow 3:
Average throughput: 4.23 Mbit/s
95th percentile per-packet one-way delay: 130.548 ms
Loss rate: 1.63%
```

Run 1: Report of Sprout — Data Link

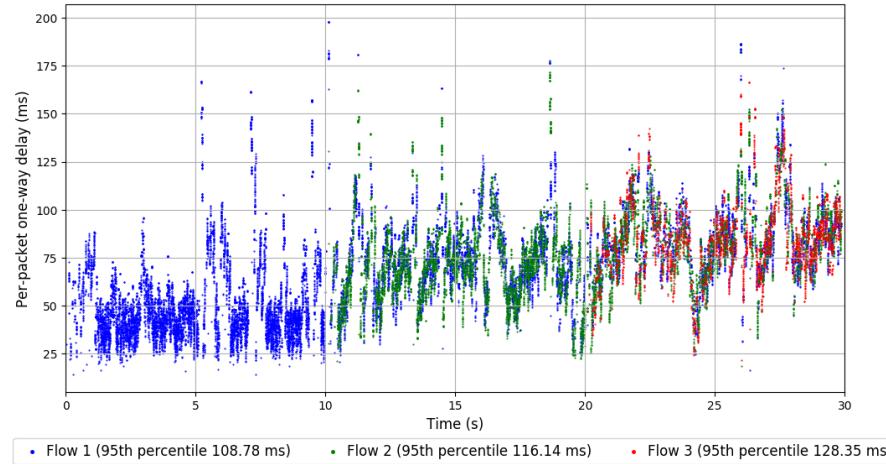
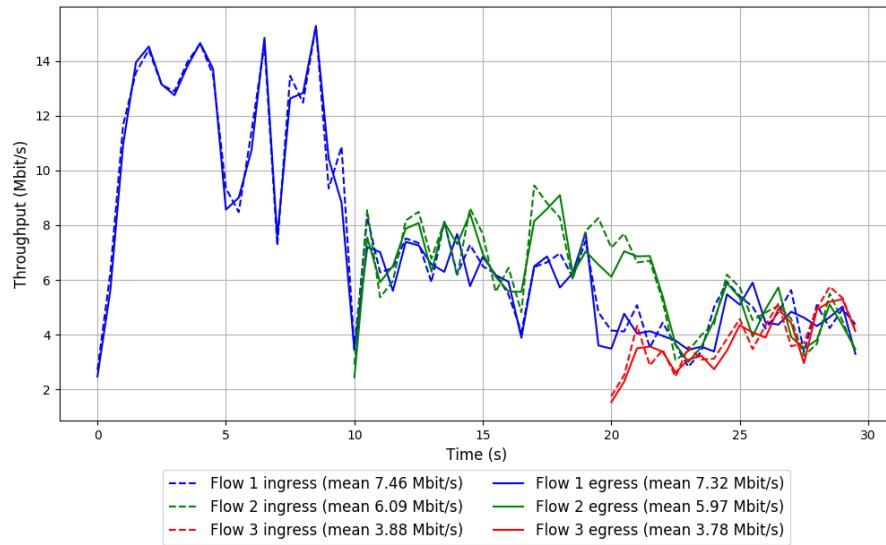


Run 2: Statistics of Sprout

```
Start at: 2017-12-05 08:20:06
End at: 2017-12-05 08:20:36
Local clock offset: 3.143 ms
Remote clock offset: -2.488 ms

# Below is generated by plot.py at 2017-12-05 09:41:46
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.49 Mbit/s
95th percentile per-packet one-way delay: 114.038 ms
Loss rate: 2.38%
-- Flow 1:
Average throughput: 7.32 Mbit/s
95th percentile per-packet one-way delay: 108.783 ms
Loss rate: 2.12%
-- Flow 2:
Average throughput: 5.97 Mbit/s
95th percentile per-packet one-way delay: 116.138 ms
Loss rate: 2.61%
-- Flow 3:
Average throughput: 3.78 Mbit/s
95th percentile per-packet one-way delay: 128.355 ms
Loss rate: 3.23%
```

Run 2: Report of Sprout — Data Link

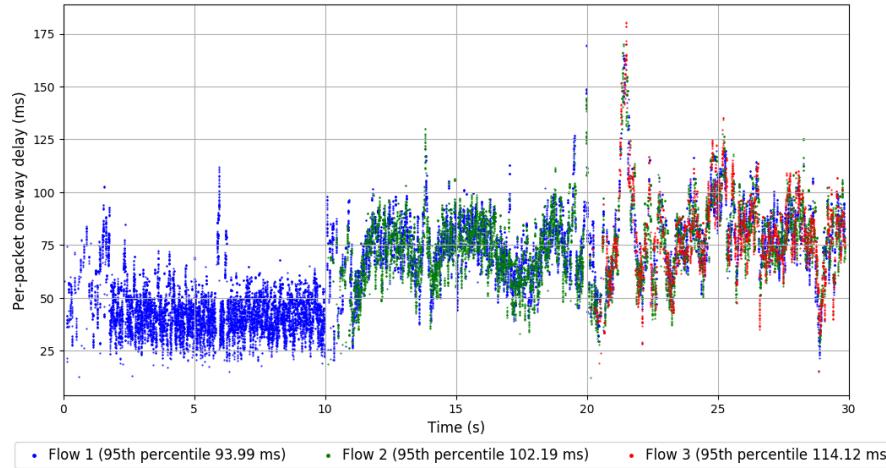
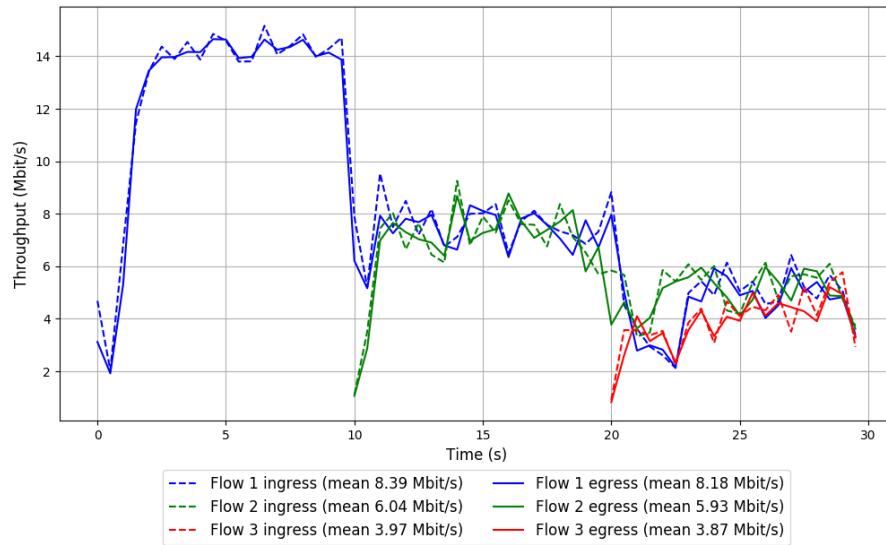


Run 3: Statistics of Sprout

```
Start at: 2017-12-05 08:36:44
End at: 2017-12-05 08:37:15
Local clock offset: 3.279 ms
Remote clock offset: -2.488 ms

# Below is generated by plot.py at 2017-12-05 09:41:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.37 Mbit/s
95th percentile per-packet one-way delay: 99.712 ms
Loss rate: 2.63%
-- Flow 1:
Average throughput: 8.18 Mbit/s
95th percentile per-packet one-way delay: 93.992 ms
Loss rate: 2.71%
-- Flow 2:
Average throughput: 5.93 Mbit/s
95th percentile per-packet one-way delay: 102.191 ms
Loss rate: 2.27%
-- Flow 3:
Average throughput: 3.87 Mbit/s
95th percentile per-packet one-way delay: 114.117 ms
Loss rate: 3.22%
```

Run 3: Report of Sprout — Data Link

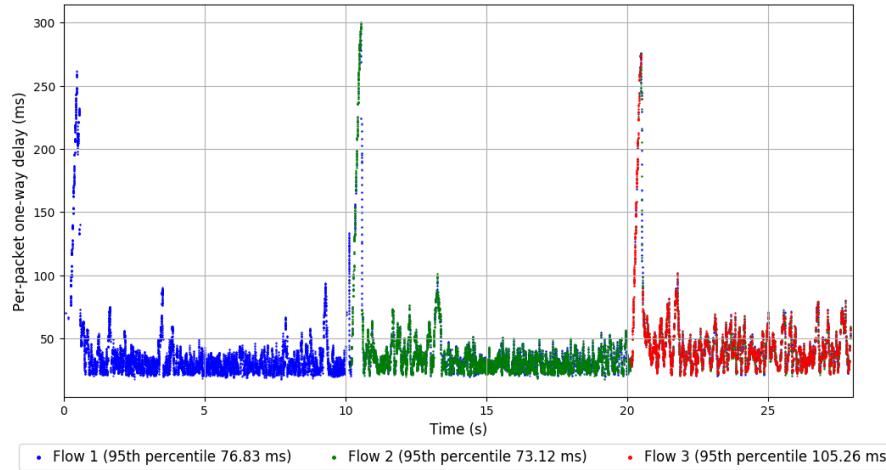
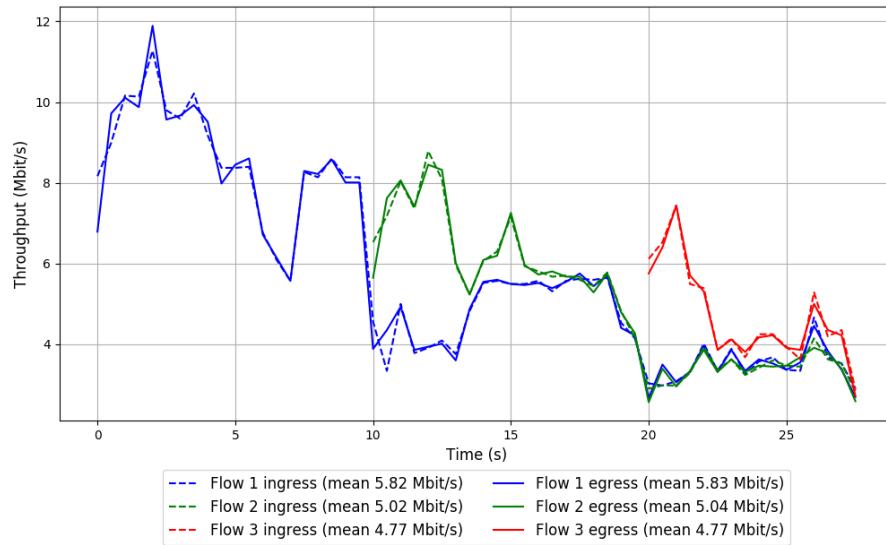


Run 1: Statistics of TaoVA-100x

```
Start at: 2017-12-05 08:02:14
End at: 2017-12-05 08:02:44
Local clock offset: 3.391 ms
Remote clock offset: -2.806 ms

# Below is generated by plot.py at 2017-12-05 09:41:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.39 Mbit/s
95th percentile per-packet one-way delay: 78.807 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 5.83 Mbit/s
95th percentile per-packet one-way delay: 76.826 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 5.04 Mbit/s
95th percentile per-packet one-way delay: 73.120 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 4.77 Mbit/s
95th percentile per-packet one-way delay: 105.258 ms
Loss rate: 0.76%
```

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

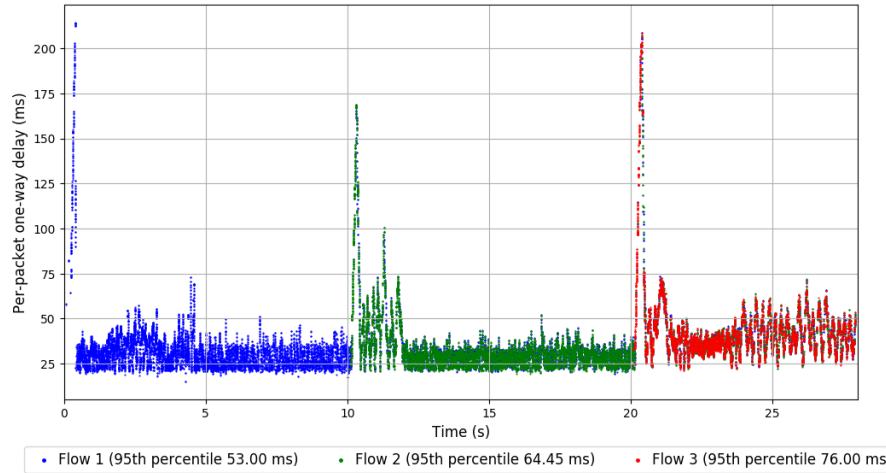
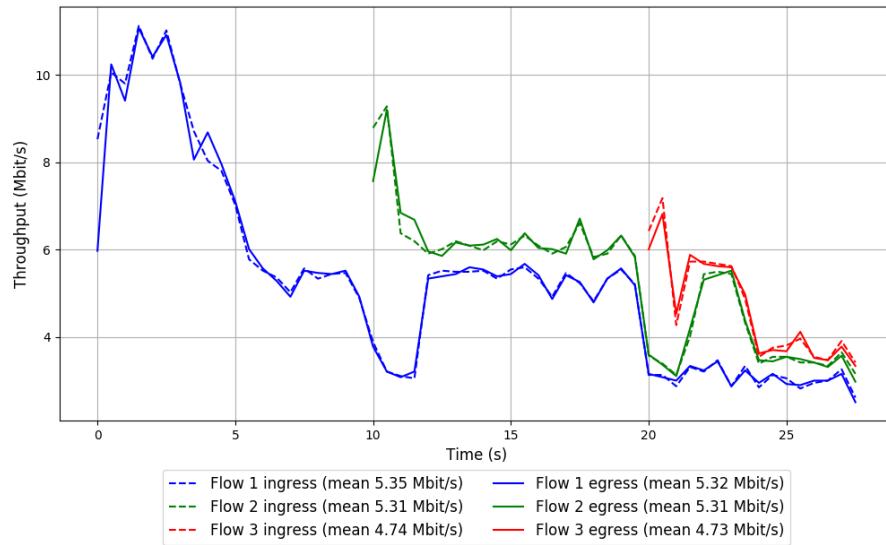


Run 2: Statistics of TaoVA-100x

```
Start at: 2017-12-05 08:18:54
End at: 2017-12-05 08:19:24
Local clock offset: 3.251 ms
Remote clock offset: -2.499 ms

# Below is generated by plot.py at 2017-12-05 09:41:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.06 Mbit/s
95th percentile per-packet one-way delay: 60.507 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 5.32 Mbit/s
95th percentile per-packet one-way delay: 52.996 ms
Loss rate: 0.84%
-- Flow 2:
Average throughput: 5.31 Mbit/s
95th percentile per-packet one-way delay: 64.448 ms
Loss rate: 0.27%
-- Flow 3:
Average throughput: 4.73 Mbit/s
95th percentile per-packet one-way delay: 75.999 ms
Loss rate: 0.77%
```

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

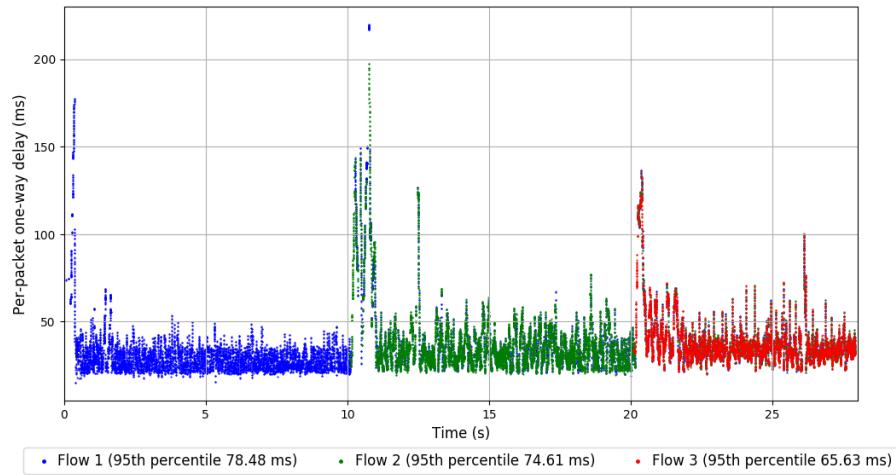
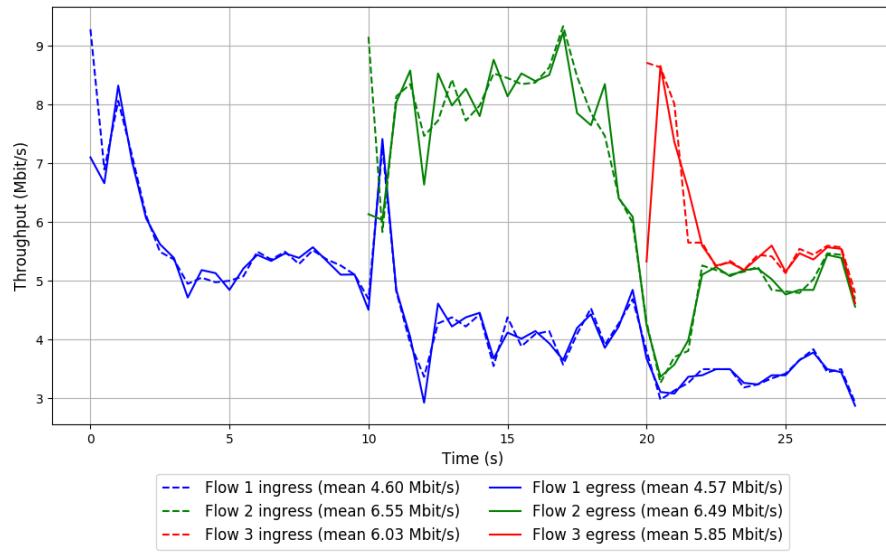


Run 3: Statistics of TaoVA-100x

```
Start at: 2017-12-05 08:35:33
End at: 2017-12-05 08:36:03
Local clock offset: 3.391 ms
Remote clock offset: -2.452 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.39 Mbit/s
95th percentile per-packet one-way delay: 73.543 ms
Loss rate: 1.48%
-- Flow 1:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 78.476 ms
Loss rate: 0.91%
-- Flow 2:
Average throughput: 6.49 Mbit/s
95th percentile per-packet one-way delay: 74.613 ms
Loss rate: 1.28%
-- Flow 3:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 65.631 ms
Loss rate: 3.55%
```

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

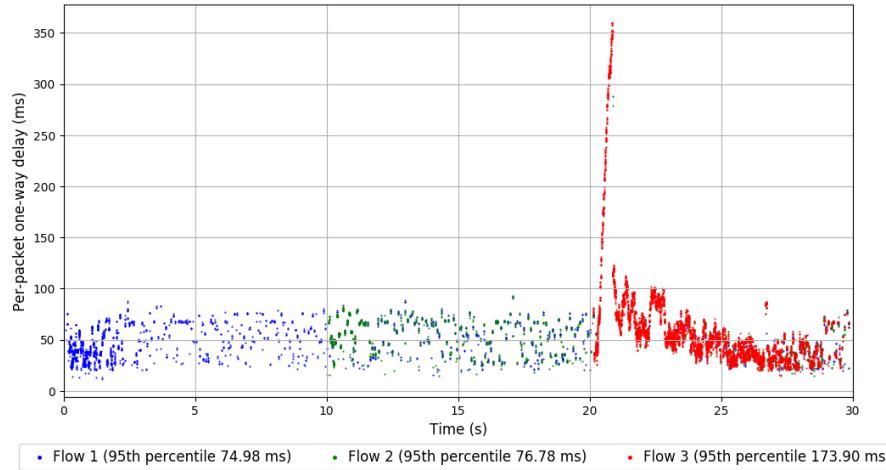
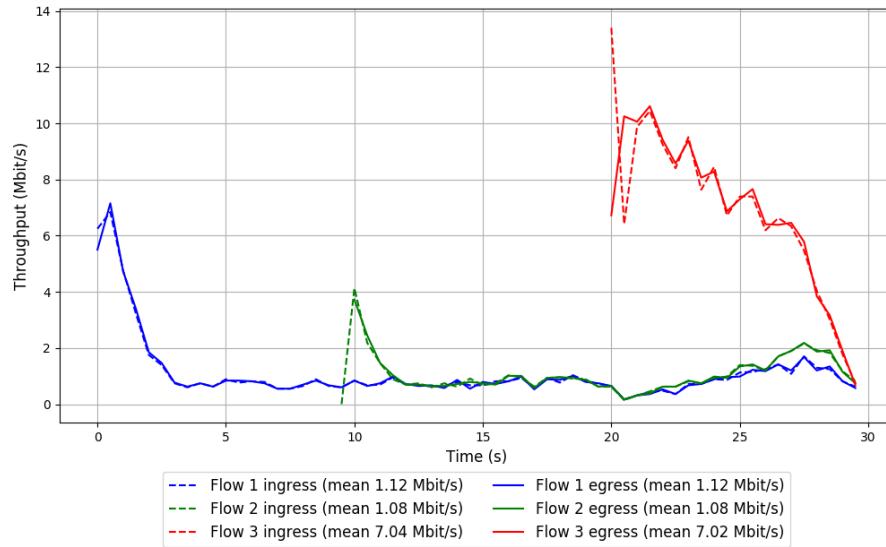


Run 1: Statistics of TCP Vegas

```
Start at: 2017-12-05 08:12:57
End at: 2017-12-05 08:13:27
Local clock offset: 3.286 ms
Remote clock offset: -2.582 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.15 Mbit/s
95th percentile per-packet one-way delay: 100.063 ms
Loss rate: 0.64%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 74.983 ms
Loss rate: 0.25%
-- Flow 2:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 76.784 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 7.02 Mbit/s
95th percentile per-packet one-way delay: 173.904 ms
Loss rate: 0.91%
```

Run 1: Report of TCP Vegas — Data Link

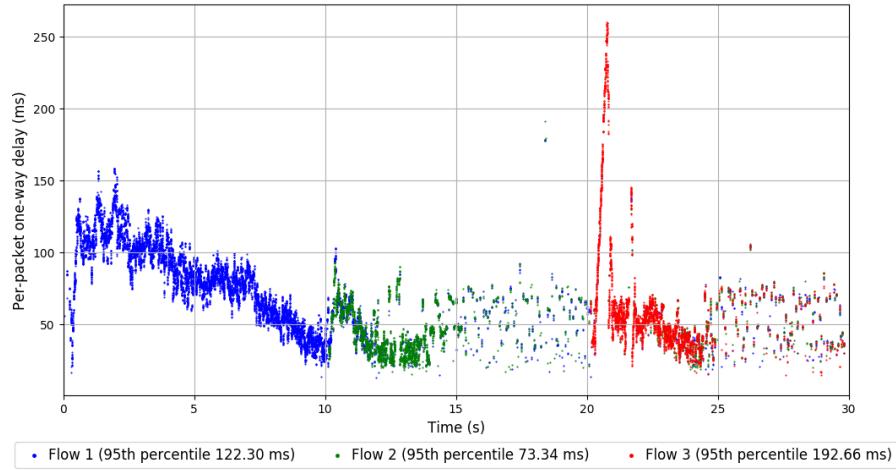
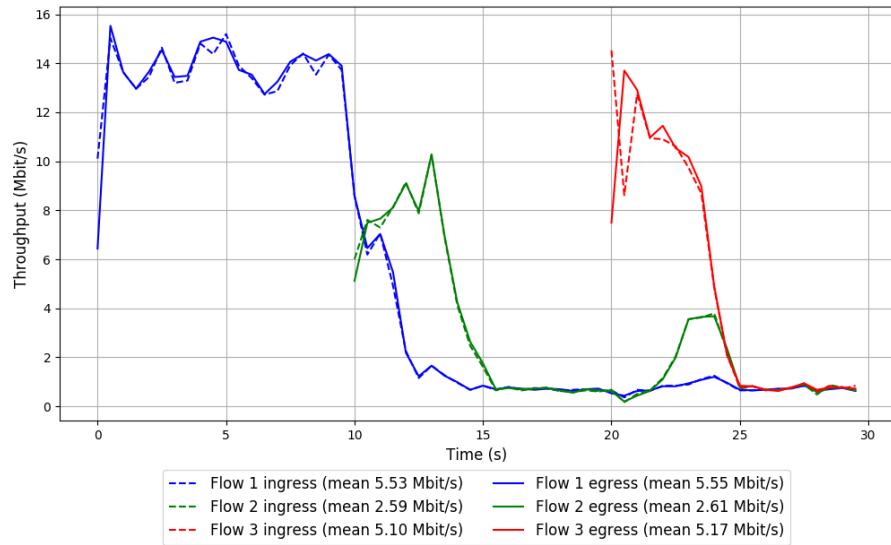


Run 2: Statistics of TCP Vegas

```
Start at: 2017-12-05 08:29:36
End at: 2017-12-05 08:30:06
Local clock offset: 3.383 ms
Remote clock offset: -2.452 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.97 Mbit/s
95th percentile per-packet one-way delay: 122.289 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 5.55 Mbit/s
95th percentile per-packet one-way delay: 122.297 ms
Loss rate: 0.04%
-- Flow 2:
Average throughput: 2.61 Mbit/s
95th percentile per-packet one-way delay: 73.342 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 5.17 Mbit/s
95th percentile per-packet one-way delay: 192.660 ms
Loss rate: 0.50%
```

Run 2: Report of TCP Vegas — Data Link

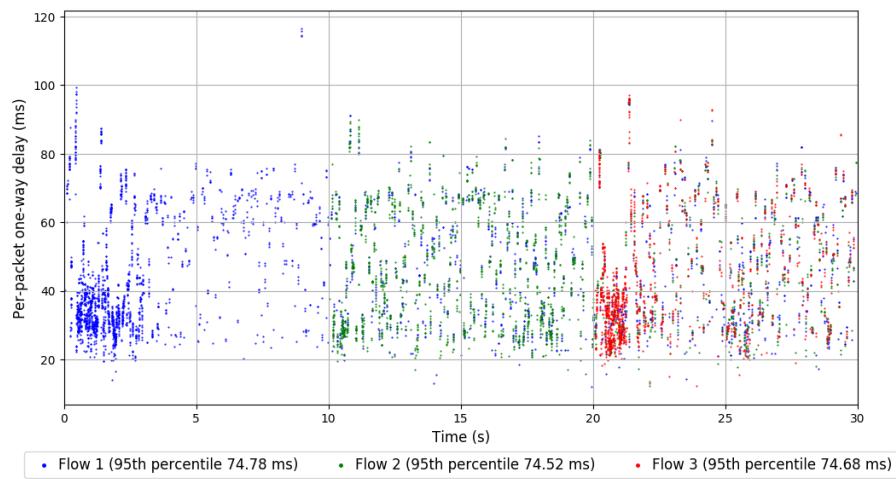
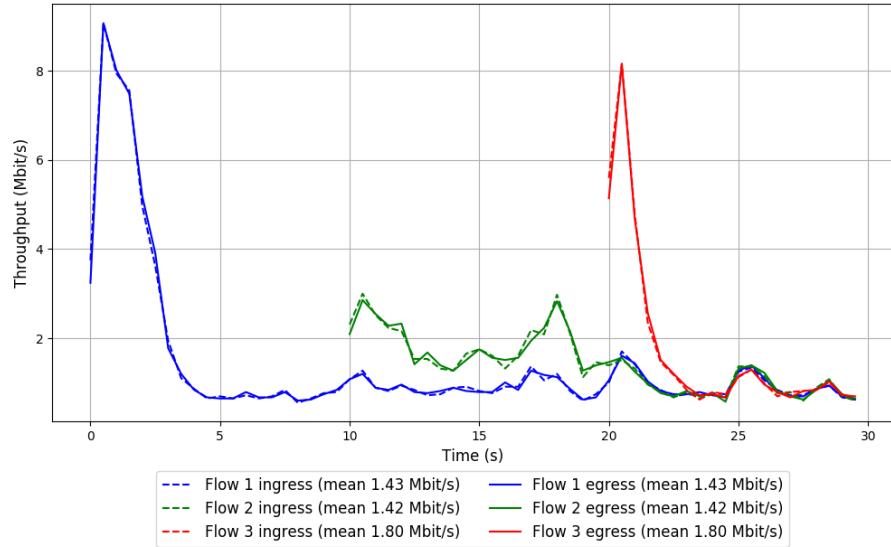


Run 3: Statistics of TCP Vegas

```
Start at: 2017-12-05 08:46:16
End at: 2017-12-05 08:46:46
Local clock offset: 3.159 ms
Remote clock offset: -2.555 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.96 Mbit/s
95th percentile per-packet one-way delay: 74.748 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 74.778 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 74.521 ms
Loss rate: 0.13%
-- Flow 3:
Average throughput: 1.80 Mbit/s
95th percentile per-packet one-way delay: 74.683 ms
Loss rate: 0.61%
```

Run 3: Report of TCP Vegas — Data Link

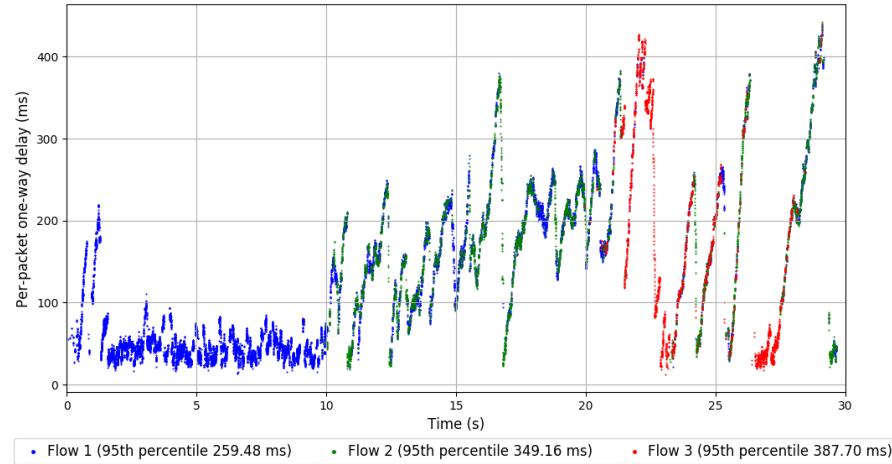
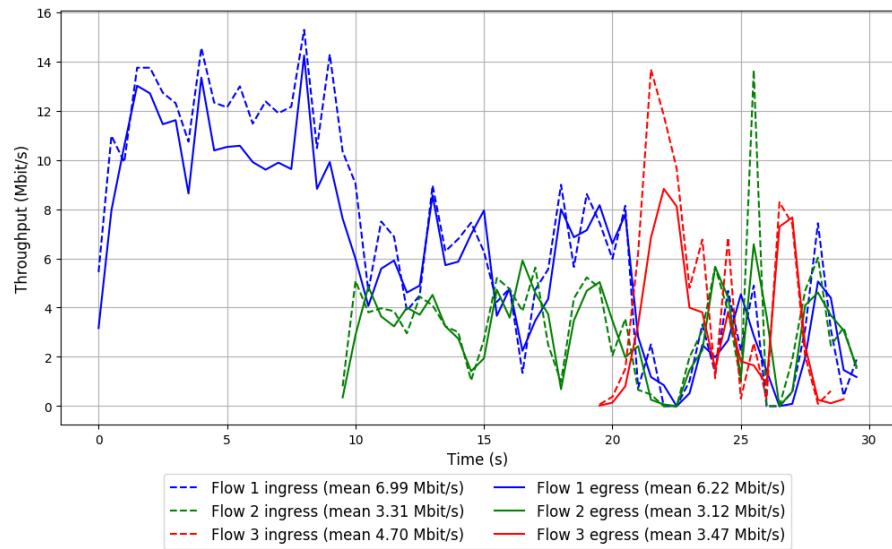


Run 1: Statistics of Verus

```
Start at: 2017-12-05 08:16:32
End at: 2017-12-05 08:17:02
Local clock offset: 3.143 ms
Remote clock offset: -2.48 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.39 Mbit/s
95th percentile per-packet one-way delay: 333.699 ms
Loss rate: 11.92%
-- Flow 1:
Average throughput: 6.22 Mbit/s
95th percentile per-packet one-way delay: 259.478 ms
Loss rate: 11.23%
-- Flow 2:
Average throughput: 3.12 Mbit/s
95th percentile per-packet one-way delay: 349.163 ms
Loss rate: 5.98%
-- Flow 3:
Average throughput: 3.47 Mbit/s
95th percentile per-packet one-way delay: 387.702 ms
Loss rate: 24.61%
```

Run 1: Report of Verus — Data Link

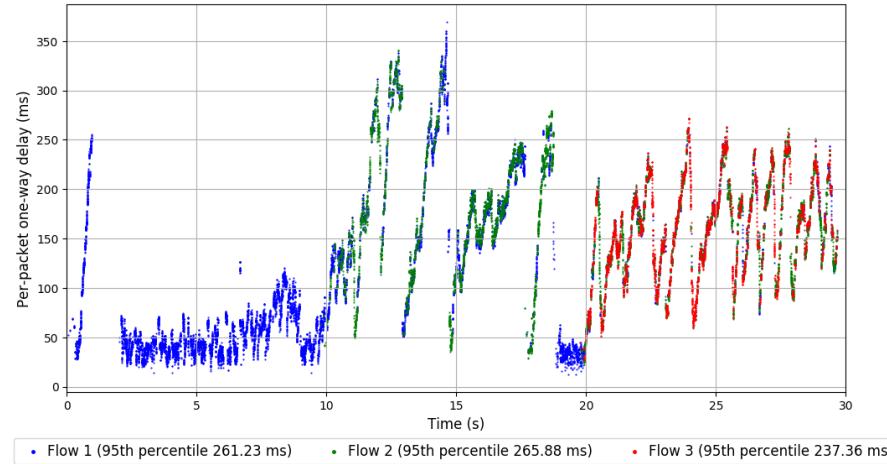
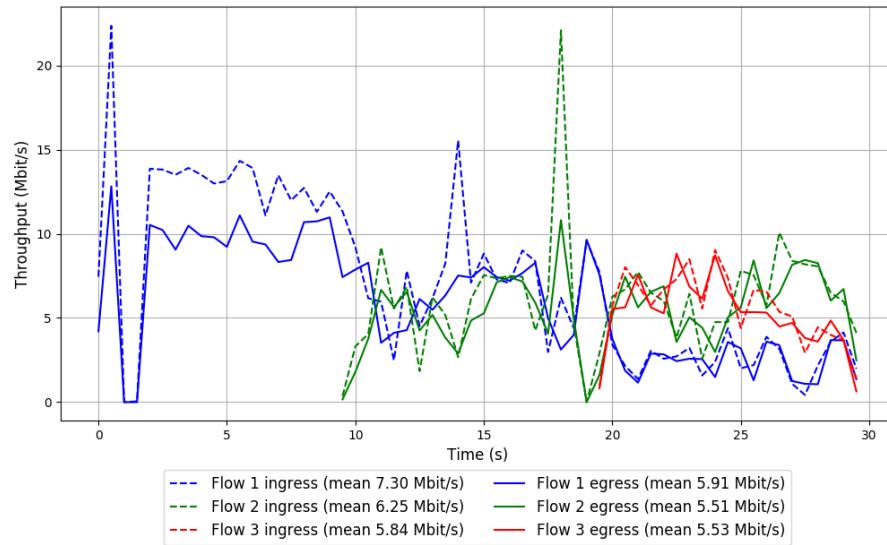


Run 2: Statistics of Verus

```
Start at: 2017-12-05 08:33:11
End at: 2017-12-05 08:33:41
Local clock offset: 3.359 ms
Remote clock offset: -2.43 ms

# Below is generated by plot.py at 2017-12-05 09:42:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.46 Mbit/s
95th percentile per-packet one-way delay: 258.674 ms
Loss rate: 15.08%
-- Flow 1:
Average throughput: 5.91 Mbit/s
95th percentile per-packet one-way delay: 261.233 ms
Loss rate: 19.15%
-- Flow 2:
Average throughput: 5.51 Mbit/s
95th percentile per-packet one-way delay: 265.879 ms
Loss rate: 12.24%
-- Flow 3:
Average throughput: 5.53 Mbit/s
95th percentile per-packet one-way delay: 237.362 ms
Loss rate: 5.98%
```

Run 2: Report of Verus — Data Link

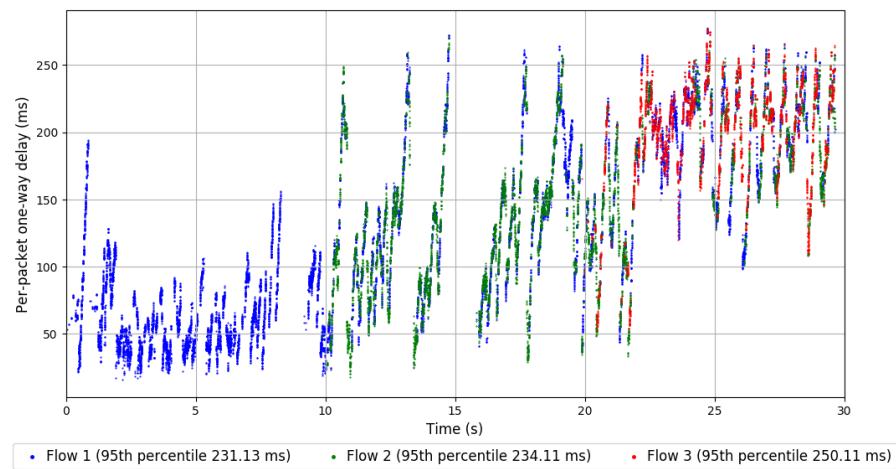
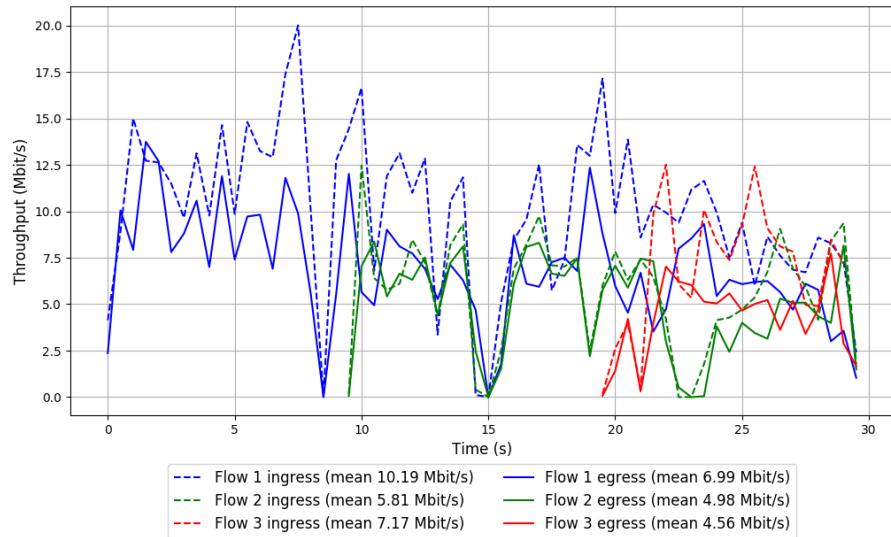


Run 3: Statistics of Verus

```
Start at: 2017-12-05 08:49:50
End at: 2017-12-05 08:50:20
Local clock offset: 3.17 ms
Remote clock offset: -2.607 ms

# Below is generated by plot.py at 2017-12-05 09:42:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.84 Mbit/s
95th percentile per-packet one-way delay: 237.442 ms
Loss rate: 27.94%
-- Flow 1:
Average throughput: 6.99 Mbit/s
95th percentile per-packet one-way delay: 231.129 ms
Loss rate: 31.28%
-- Flow 2:
Average throughput: 4.98 Mbit/s
95th percentile per-packet one-way delay: 234.113 ms
Loss rate: 14.48%
-- Flow 3:
Average throughput: 4.56 Mbit/s
95th percentile per-packet one-way delay: 250.113 ms
Loss rate: 35.90%
```

Run 3: Report of Verus — Data Link

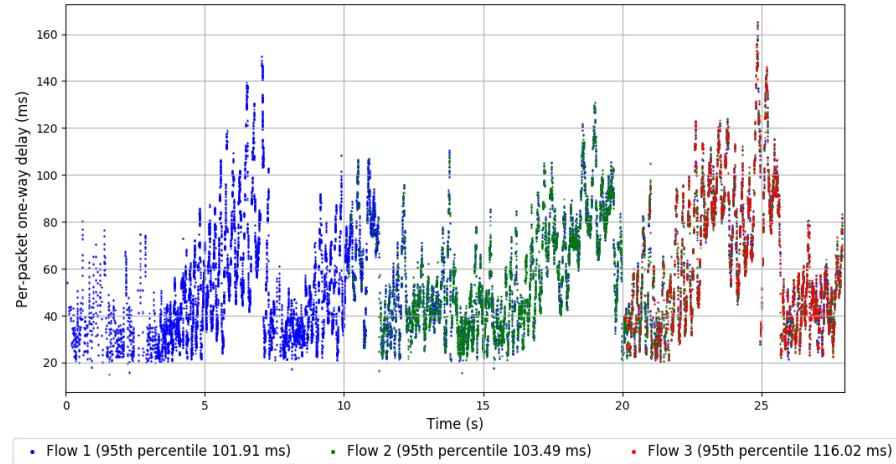
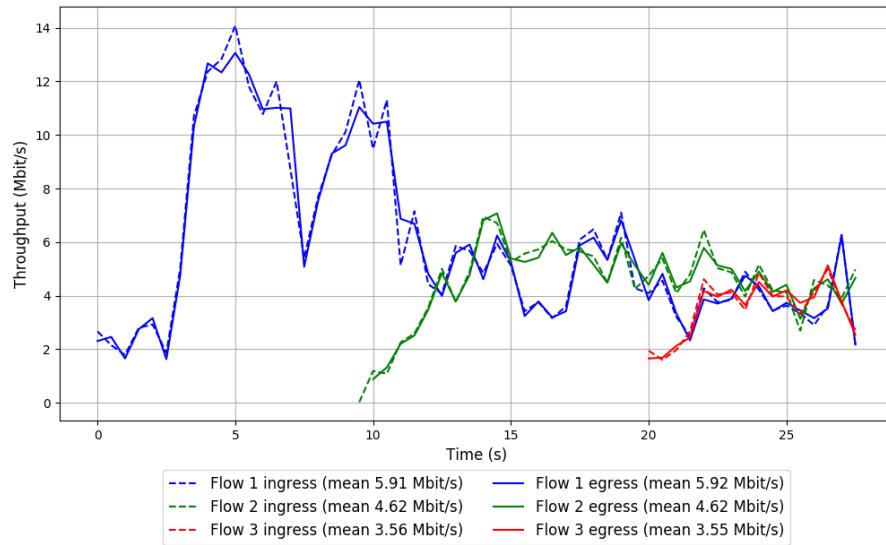


Run 1: Statistics of Copa

```
Start at: 2017-12-05 08:15:20
End at: 2017-12-05 08:15:50
Local clock offset: 3.273 ms
Remote clock offset: -2.494 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.88 Mbit/s
95th percentile per-packet one-way delay: 104.277 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 5.92 Mbit/s
95th percentile per-packet one-way delay: 101.911 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 4.62 Mbit/s
95th percentile per-packet one-way delay: 103.489 ms
Loss rate: 0.48%
-- Flow 3:
Average throughput: 3.55 Mbit/s
95th percentile per-packet one-way delay: 116.023 ms
Loss rate: 0.74%
```

Run 1: Report of Copa — Data Link

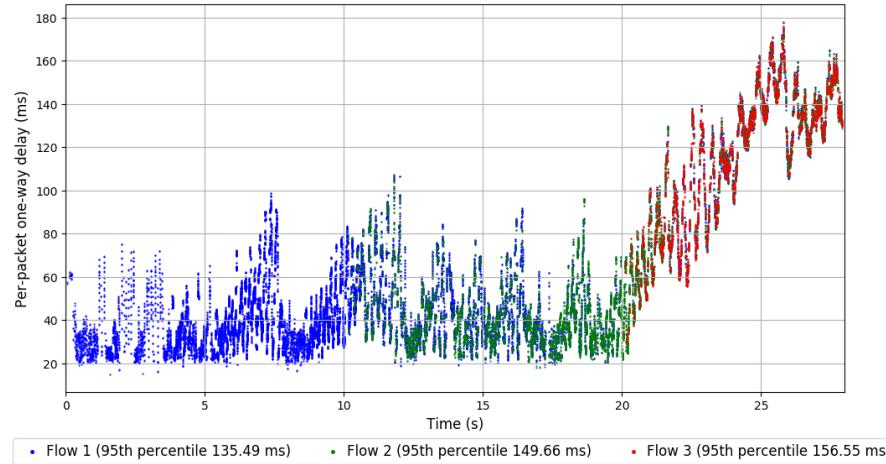
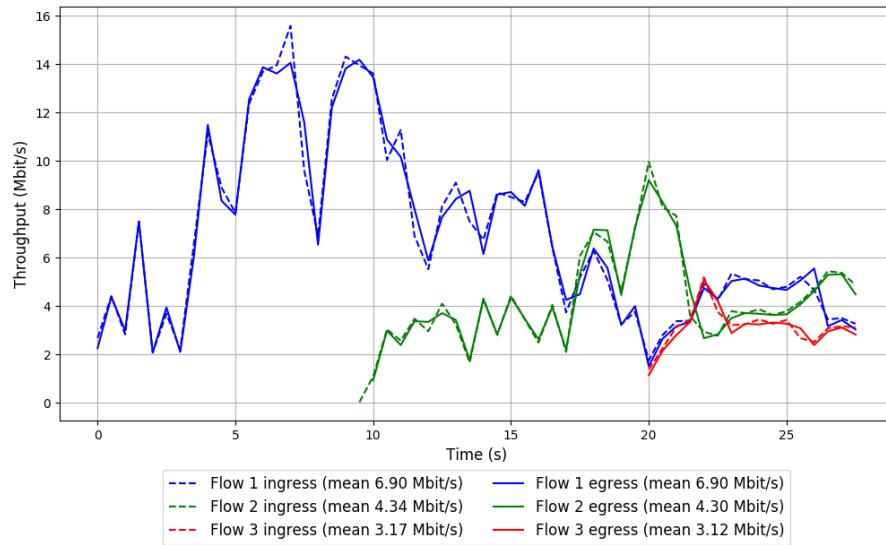


Run 2: Statistics of Copa

```
Start at: 2017-12-05 08:31:59
End at: 2017-12-05 08:32:29
Local clock offset: 3.435 ms
Remote clock offset: -2.357 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.54 Mbit/s
95th percentile per-packet one-way delay: 145.415 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 6.90 Mbit/s
95th percentile per-packet one-way delay: 135.489 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 4.30 Mbit/s
95th percentile per-packet one-way delay: 149.659 ms
Loss rate: 1.22%
-- Flow 3:
Average throughput: 3.12 Mbit/s
95th percentile per-packet one-way delay: 156.554 ms
Loss rate: 2.38%
```

Run 2: Report of Copa — Data Link

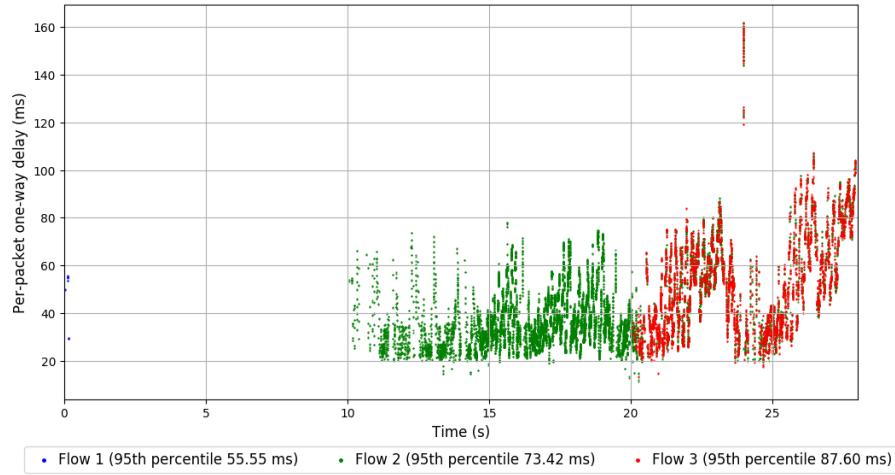
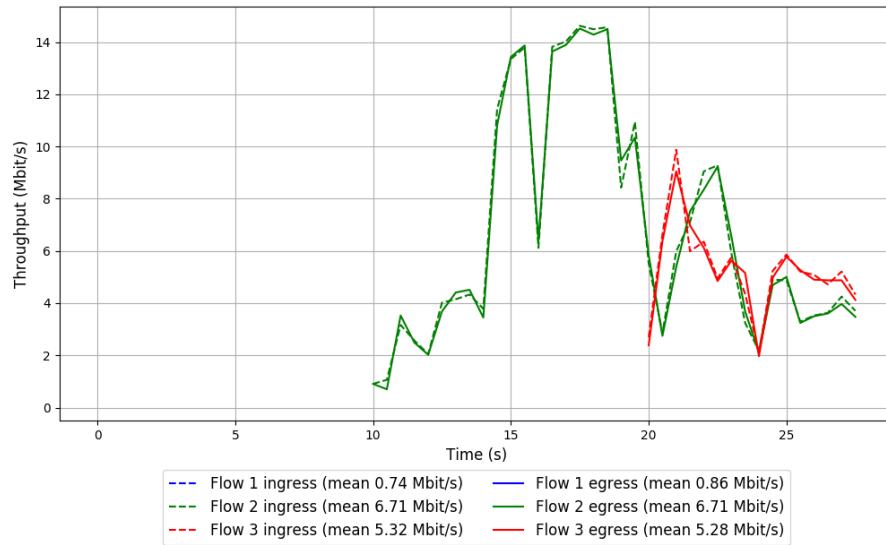


Run 3: Statistics of Copa

```
Start at: 2017-12-05 08:48:39
End at: 2017-12-05 08:49:09
Local clock offset: 3.214 ms
Remote clock offset: -2.507 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.80 Mbit/s
95th percentile per-packet one-way delay: 79.314 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 55.554 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 6.71 Mbit/s
95th percentile per-packet one-way delay: 73.417 ms
Loss rate: 0.51%
-- Flow 3:
Average throughput: 5.28 Mbit/s
95th percentile per-packet one-way delay: 87.601 ms
Loss rate: 1.26%
```

Run 3: Report of Copa — Data Link

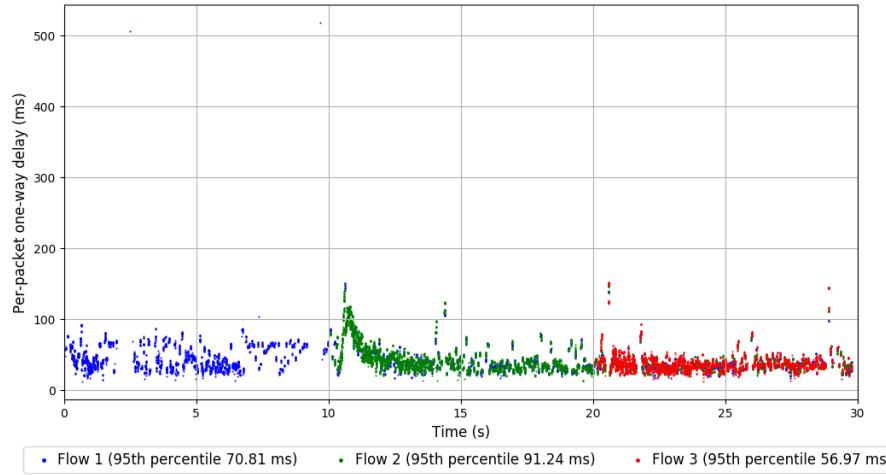
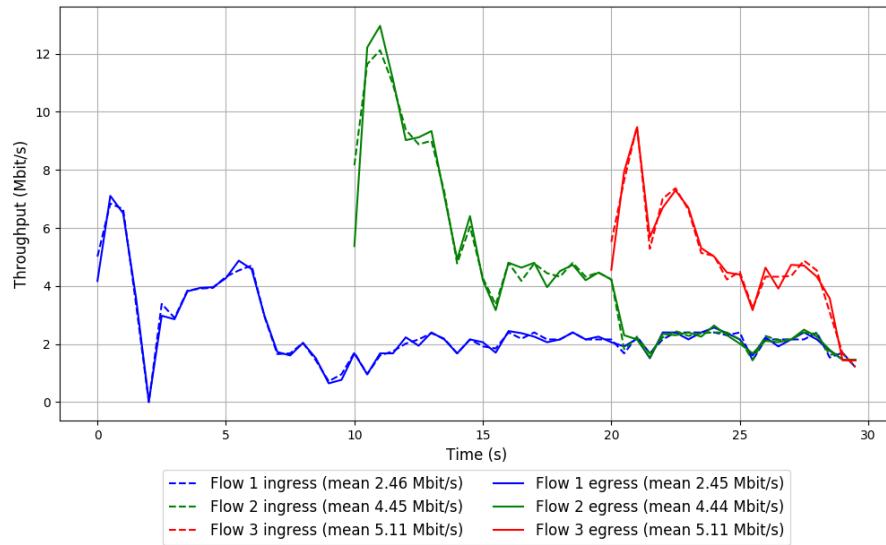


Run 1: Statistics of Indigo

```
Start at: 2017-12-05 08:07:00
End at: 2017-12-05 08:07:30
Local clock offset: 3.354 ms
Remote clock offset: -2.574 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.07 Mbit/s
95th percentile per-packet one-way delay: 78.041 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 2.45 Mbit/s
95th percentile per-packet one-way delay: 70.807 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 4.44 Mbit/s
95th percentile per-packet one-way delay: 91.238 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 56.974 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link

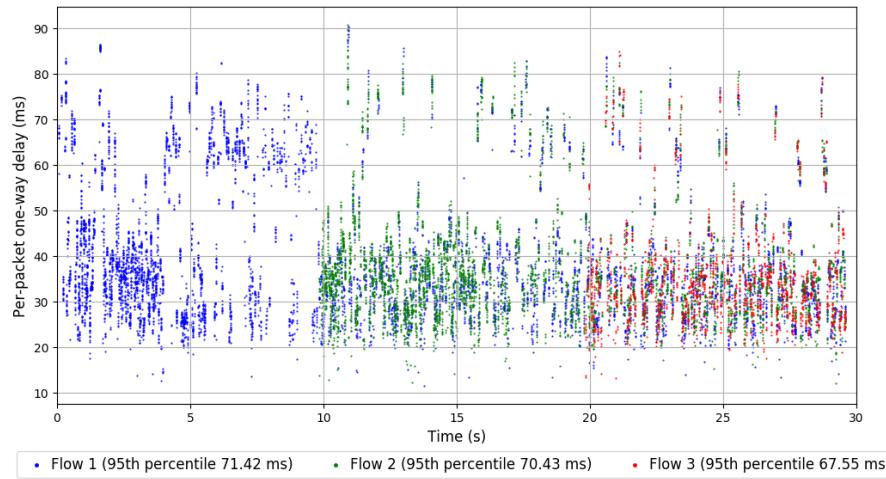
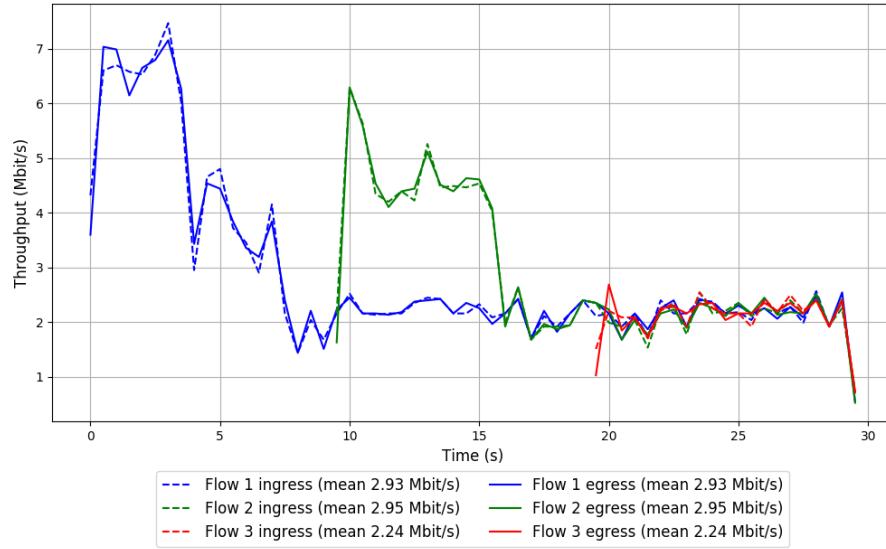


Run 2: Statistics of Indigo

```
Start at: 2017-12-05 08:23:40
End at: 2017-12-05 08:24:10
Local clock offset: 3.168 ms
Remote clock offset: -2.428 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.65 Mbit/s
95th percentile per-packet one-way delay: 70.716 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.93 Mbit/s
95th percentile per-packet one-way delay: 71.420 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 70.430 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 2.24 Mbit/s
95th percentile per-packet one-way delay: 67.551 ms
Loss rate: 0.55%
```

Run 2: Report of Indigo — Data Link

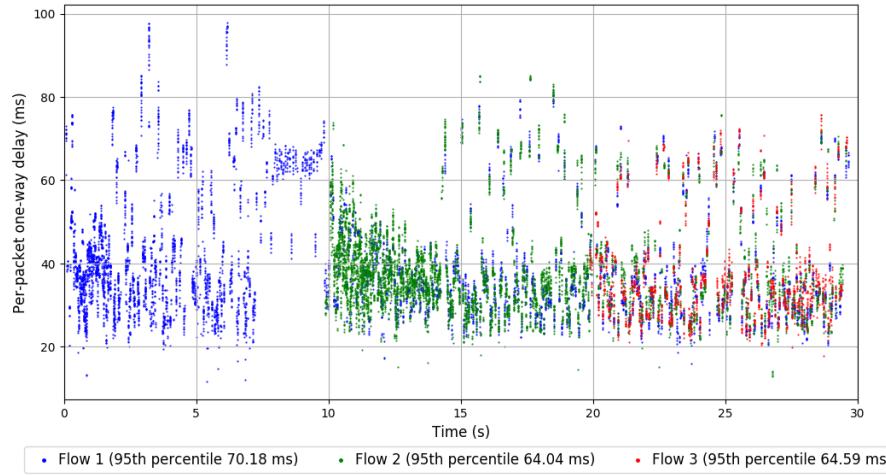
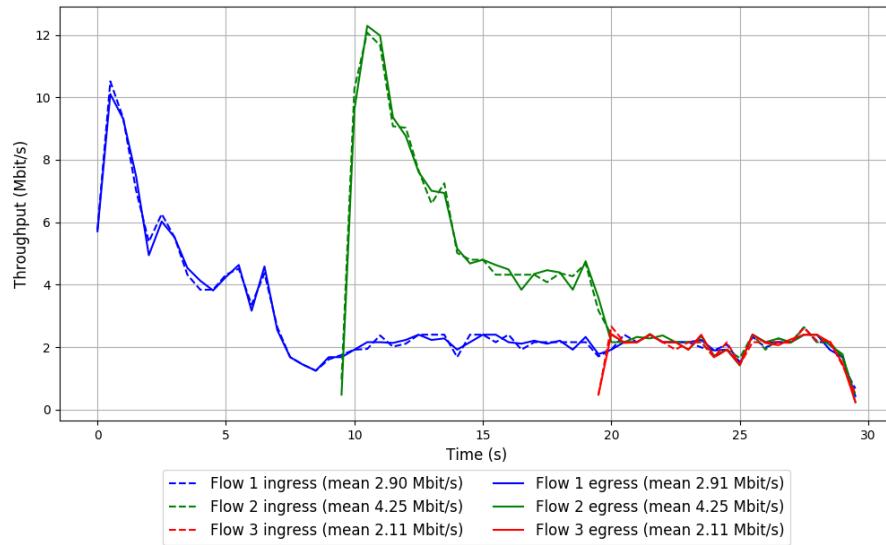


Run 3: Statistics of Indigo

```
Start at: 2017-12-05 08:40:19
End at: 2017-12-05 08:40:49
Local clock offset: 3.238 ms
Remote clock offset: -2.529 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.43 Mbit/s
95th percentile per-packet one-way delay: 67.278 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 70.184 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 64.036 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 64.588 ms
Loss rate: 0.64%
```

Run 3: Report of Indigo — Data Link

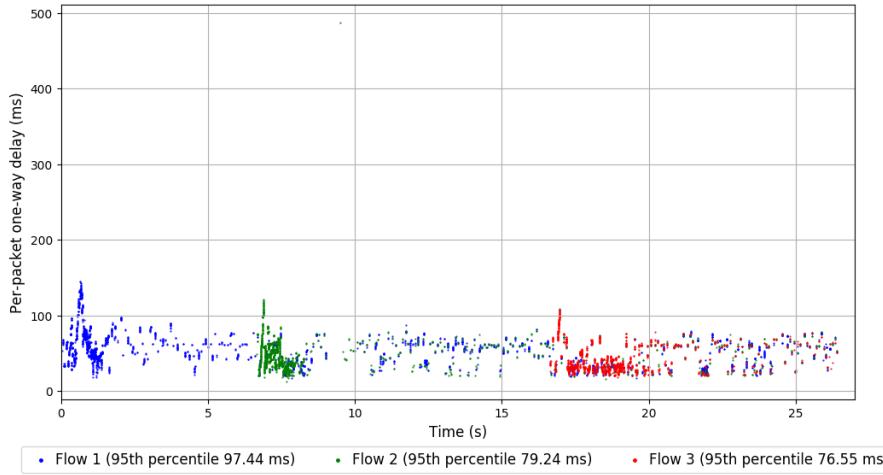
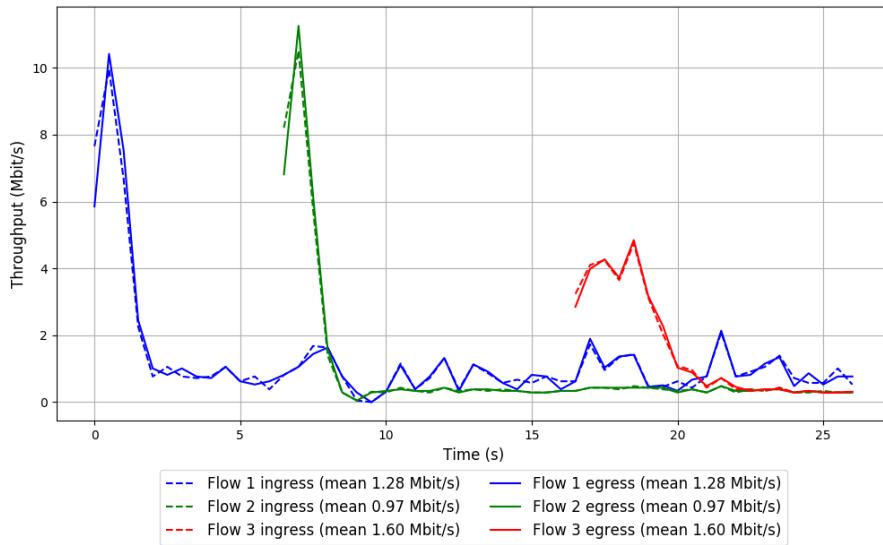


```
Run 1: Statistics of Indigo-calib

Start at: 2017-12-05 08:10:34
End at: 2017-12-05 08:11:04
Local clock offset: 3.291 ms
Remote clock offset: -2.537 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.60 Mbit/s
95th percentile per-packet one-way delay: 86.344 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 97.438 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 0.97 Mbit/s
95th percentile per-packet one-way delay: 79.240 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 1.60 Mbit/s
95th percentile per-packet one-way delay: 76.554 ms
Loss rate: 0.23%
```

Run 1: Report of Indigo-calib — Data Link

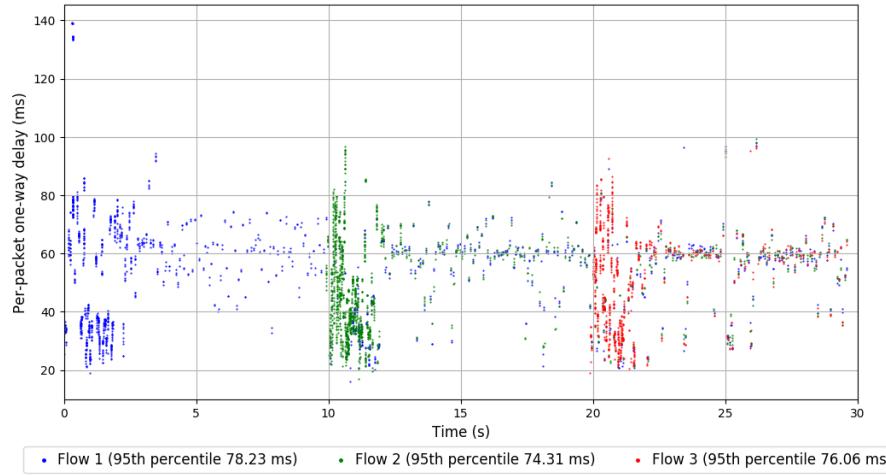
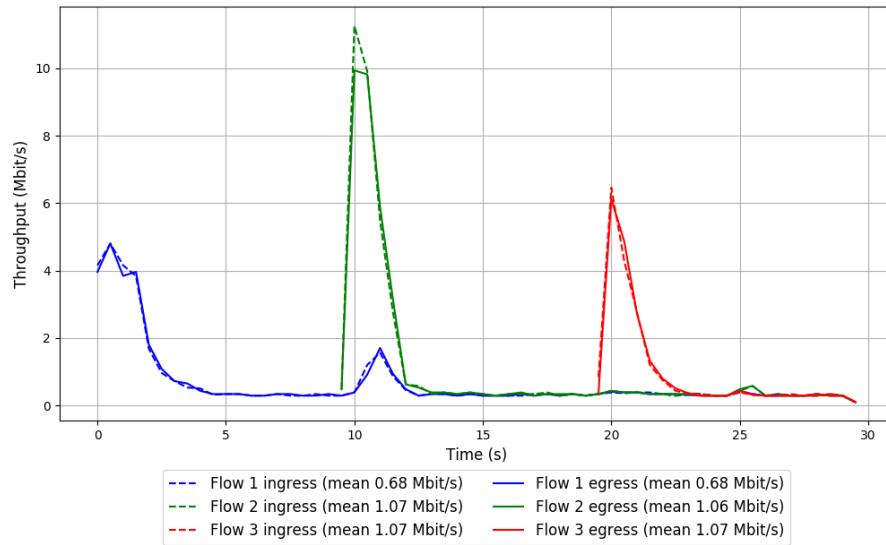


Run 2: Statistics of Indigo-calib

```
Start at: 2017-12-05 08:27:14
End at: 2017-12-05 08:27:44
Local clock offset: 3.315 ms
Remote clock offset: -2.408 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 76.480 ms
Loss rate: 0.77%
-- Flow 1:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 78.232 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 74.309 ms
Loss rate: 1.47%
-- Flow 3:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 76.056 ms
Loss rate: 0.46%
```

Run 2: Report of Indigo-calib — Data Link



Run 3: Statistics of Indigo-calib

```
Start at: 2017-12-05 08:43:54
End at: 2017-12-05 08:44:24
Local clock offset: 3.274 ms
Remote clock offset: -2.441 ms

# Below is generated by plot.py at 2017-12-05 09:42:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 76.154 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 73.652 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 132.346 ms
Loss rate: 0.16%
-- Flow 3:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 66.366 ms
Loss rate: 0.13%
```

Run 3: Report of Indigo-calib — Data Link

