

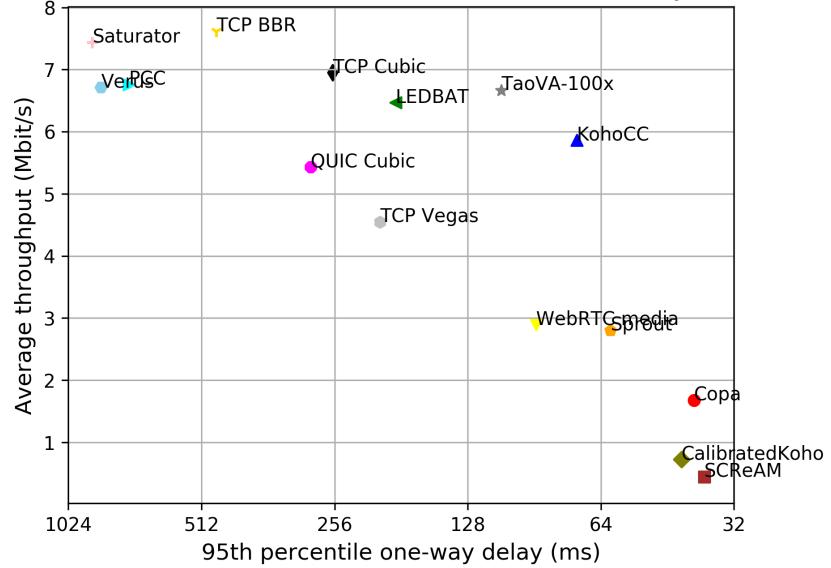
Pantheon Report

Generated at 2017-08-13 07:36:26 (UTC).
Data path: AWS India 1 Ethernet (*local*) → India ppp0 (*remote*).
Repeated the test of 15 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 nets.org.sg and have been applied to correct the timestamps in logs.

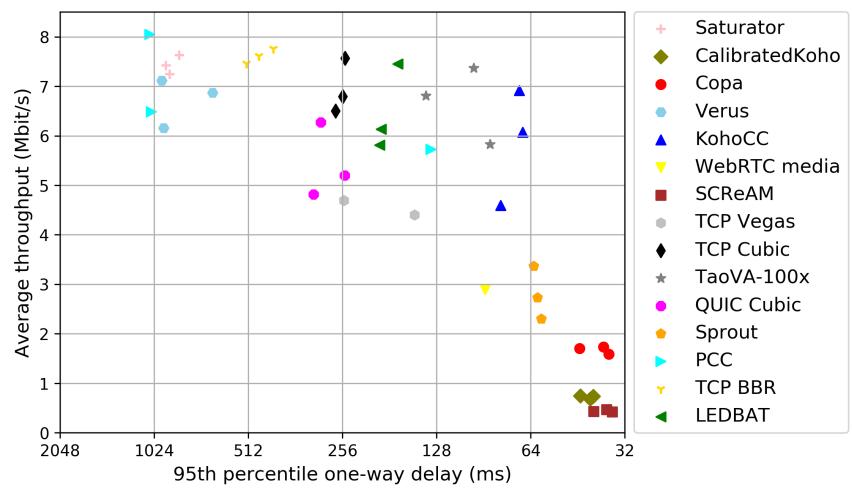
Git summary:

```
branch: master @ e43be7582298d552838afcfc6382342bf187fbdbd6
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/genericCC @ dae96123232f1bcb37725348fa2378691ce26725
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-stimuli @ fc73a85ca16c34366d1888dc8a0d0d88d4ebf2a7
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS India 1 Ethernet to India ppp0, 3 runs of 30s each per scheme
 3 flows with 10s interval between flows (mean of all runs by scheme)



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



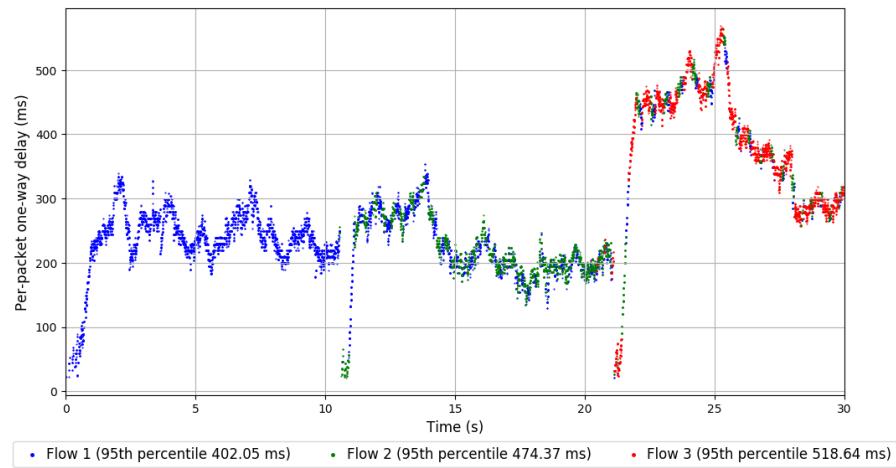
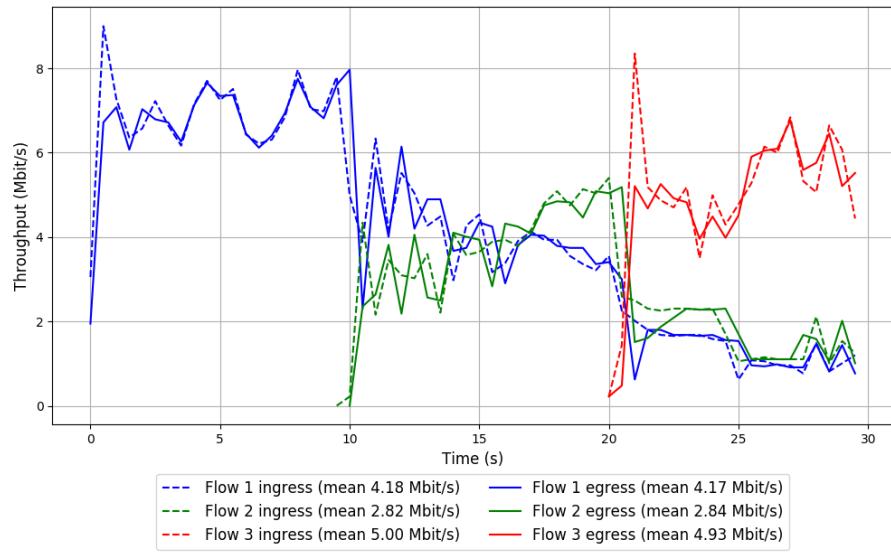
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	4.18	3.17	4.26	389.19	475.47	518.35	0.81	1.31	2.81
CalibratedKoho	3	0.31	0.38	0.47	42.30	43.56	41.62	0.04	0.16	0.30
Copa	3	0.84	0.82	0.85	39.00	40.17	39.40	0.36	0.38	0.80
TCP Cubic	3	5.29	1.32	2.41	247.29	276.10	281.77	0.36	1.64	2.18
KohoCC	3	3.18	3.18	1.72	72.90	72.48	73.40	0.19	0.16	0.91
LEDBAT	3	4.41	2.29	1.64	179.50	195.95	198.03	0.33	0.33	1.95
PCC	3	4.65	2.34	1.85	736.22	750.08	802.63	9.67	32.78	50.01
QUIC Cubic	3	1.73	4.70	1.93	122.42	283.98	307.33	0.37	1.60	3.05
Saturator	3	4.69	3.11	2.33	866.74	911.29	933.86	2.25	4.20	9.72
SCReAM	3	0.22	0.22	0.21	36.69	36.56	33.85	0.05	0.13	0.83
Sprout	3	1.48	1.32	1.36	61.72	58.34	62.36	0.54	0.11	0.23
TaoVA-100x	3	4.63	3.71	3.39	92.97	191.74	299.74	0.66	0.26	0.41
TCP Vegas	2	0.89	2.40	6.27	94.63	162.03	258.34	1.15	0.05	0.45
Verus	3	4.73	2.21	1.71	817.14	898.72	945.63	4.90	7.44	9.50
WebRTC media	1	1.95	0.65	0.30	80.83	90.03	110.73	0.08	0.24	0.97

Run 1: Statistics of TCP BBR

```
Start at: 2017-08-13 06:52:16
End at: 2017-08-13 06:52:46
Local clock offset: 0.636 ms
Remote clock offset: -19.25 ms

# Below is generated by plot.py at 2017-08-13 07:35:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.62 Mbit/s
95th percentile per-packet one-way delay: 474.561 ms
Loss rate: 1.29%
-- Flow 1:
Average throughput: 4.17 Mbit/s
95th percentile per-packet one-way delay: 402.051 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 2.84 Mbit/s
95th percentile per-packet one-way delay: 474.369 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 4.93 Mbit/s
95th percentile per-packet one-way delay: 518.639 ms
Loss rate: 3.48%
```

Run 1: Report of TCP BBR — Data Link

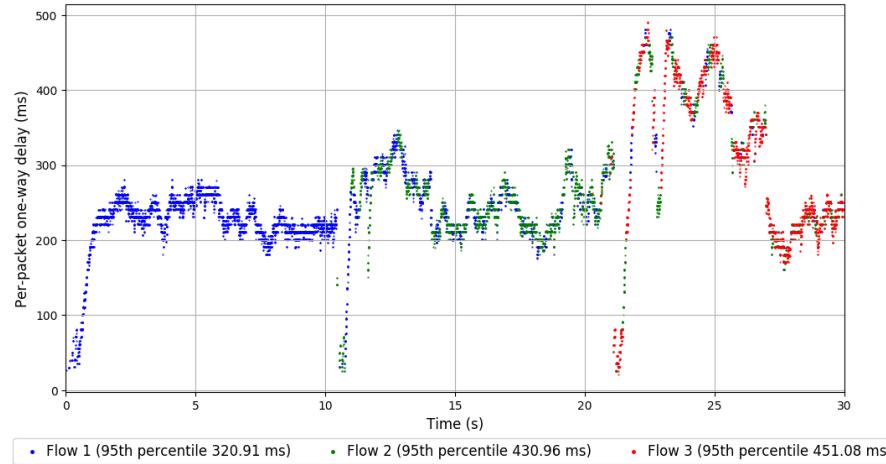
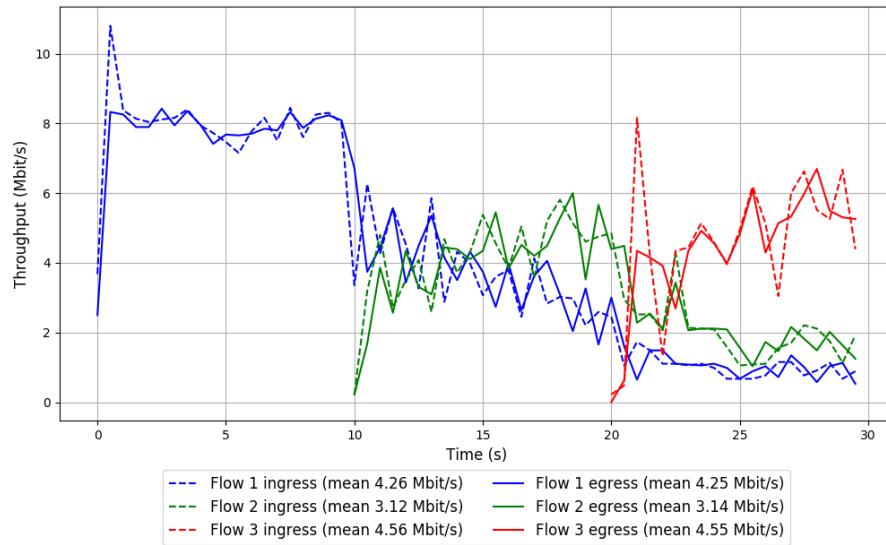


Run 2: Statistics of TCP BBR

```
Start at: 2017-08-13 07:09:36
End at: 2017-08-13 07:10:06
Local clock offset: 0.205 ms
Remote clock offset: -17.257 ms

# Below is generated by plot.py at 2017-08-13 07:35:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.76 Mbit/s
95th percentile per-packet one-way delay: 425.950 ms
Loss rate: 1.12%
-- Flow 1:
Average throughput: 4.25 Mbit/s
95th percentile per-packet one-way delay: 320.910 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 3.14 Mbit/s
95th percentile per-packet one-way delay: 430.959 ms
Loss rate: 1.08%
-- Flow 3:
Average throughput: 4.55 Mbit/s
95th percentile per-packet one-way delay: 451.085 ms
Loss rate: 2.99%
```

Run 2: Report of TCP BBR — Data Link

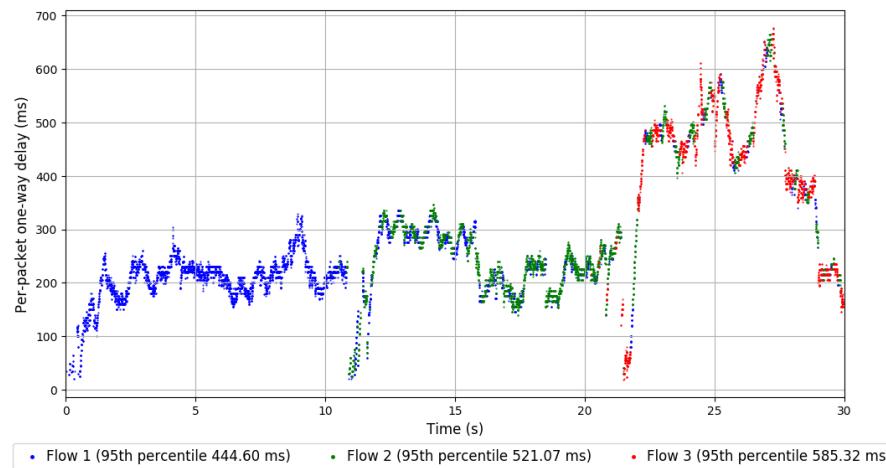
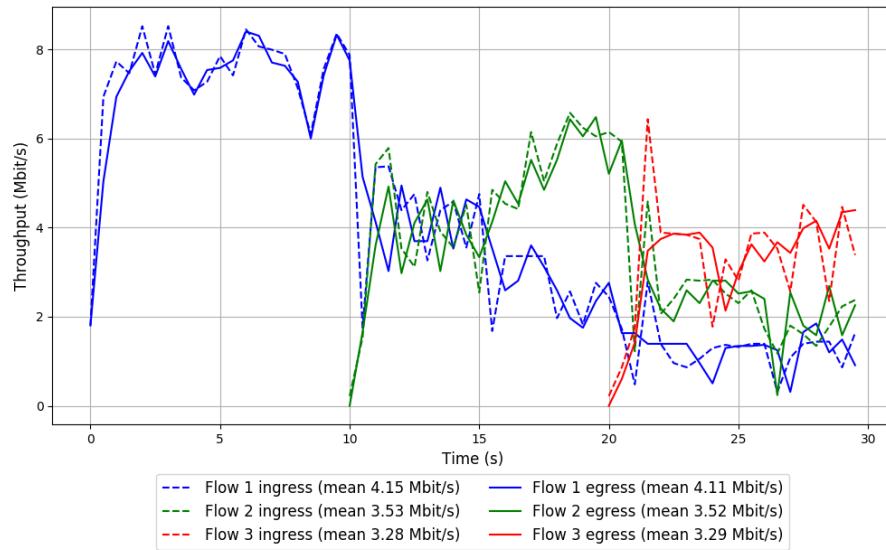


Run 3: Statistics of TCP BBR

```
Start at: 2017-08-13 07:28:56
End at: 2017-08-13 07:29:26
Local clock offset: 1.682 ms
Remote clock offset: -17.679 ms

# Below is generated by plot.py at 2017-08-13 07:35:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.46 Mbit/s
95th percentile per-packet one-way delay: 520.490 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 4.11 Mbit/s
95th percentile per-packet one-way delay: 444.599 ms
Loss rate: 1.34%
-- Flow 2:
Average throughput: 3.52 Mbit/s
95th percentile per-packet one-way delay: 521.070 ms
Loss rate: 2.01%
-- Flow 3:
Average throughput: 3.29 Mbit/s
95th percentile per-packet one-way delay: 585.319 ms
Loss rate: 1.95%
```

Run 3: Report of TCP BBR — Data Link

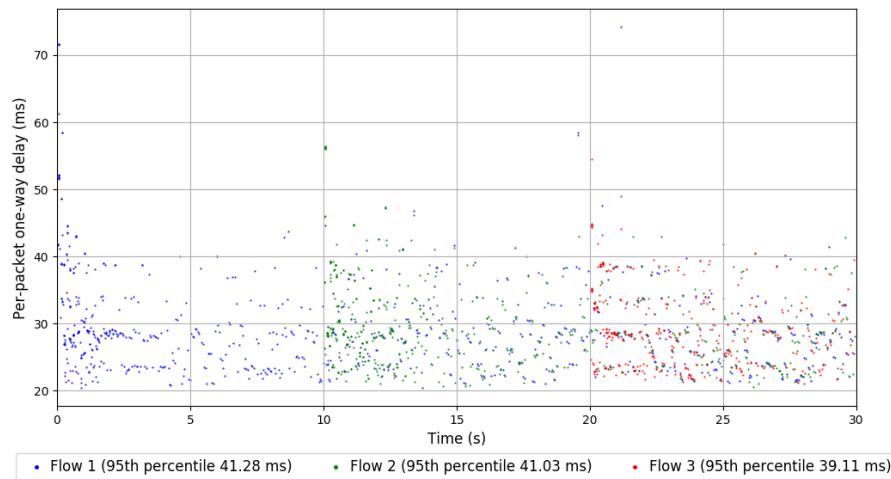
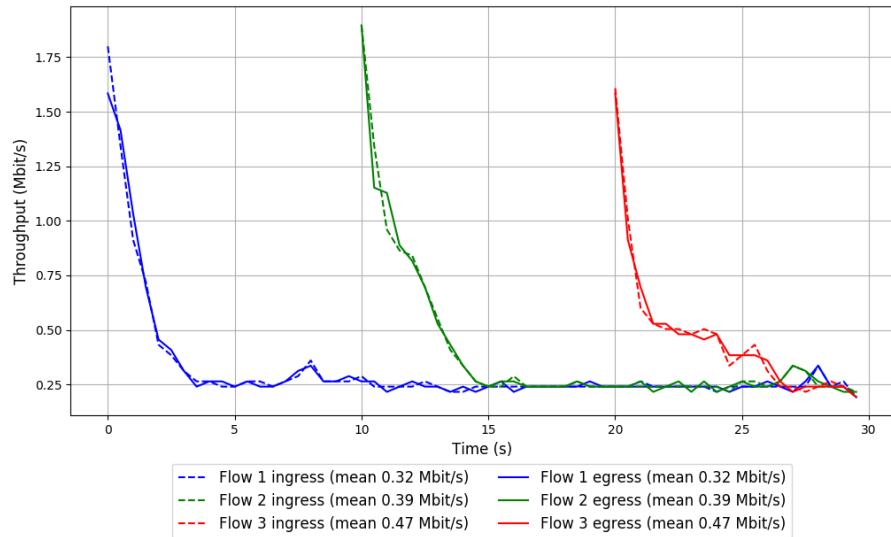


```
Run 1: Statistics of CalibratedKoho

Start at: 2017-08-13 06:51:10
End at: 2017-08-13 06:51:40
Local clock offset: 1.052 ms
Remote clock offset: -19.024 ms

# Below is generated by plot.py at 2017-08-13 07:35:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 40.450 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 41.280 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 41.031 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 39.109 ms
Loss rate: 0.26%
```

Run 1: Report of CalibratedKoho — Data Link

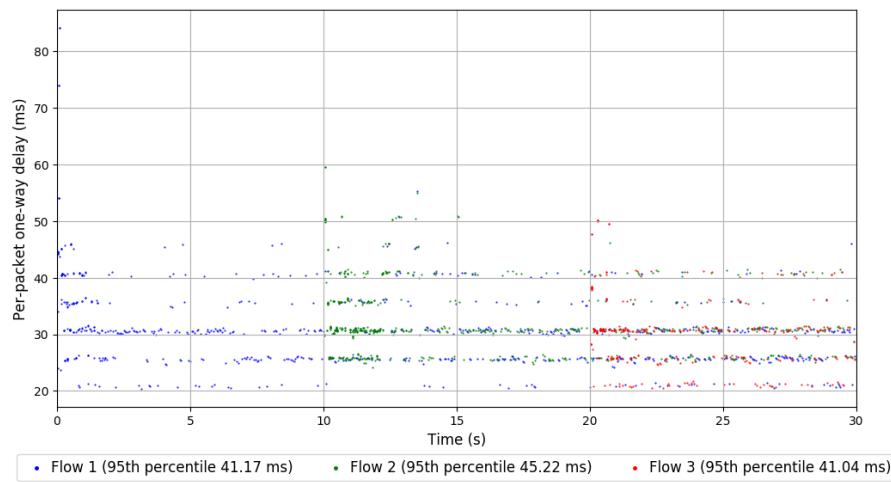
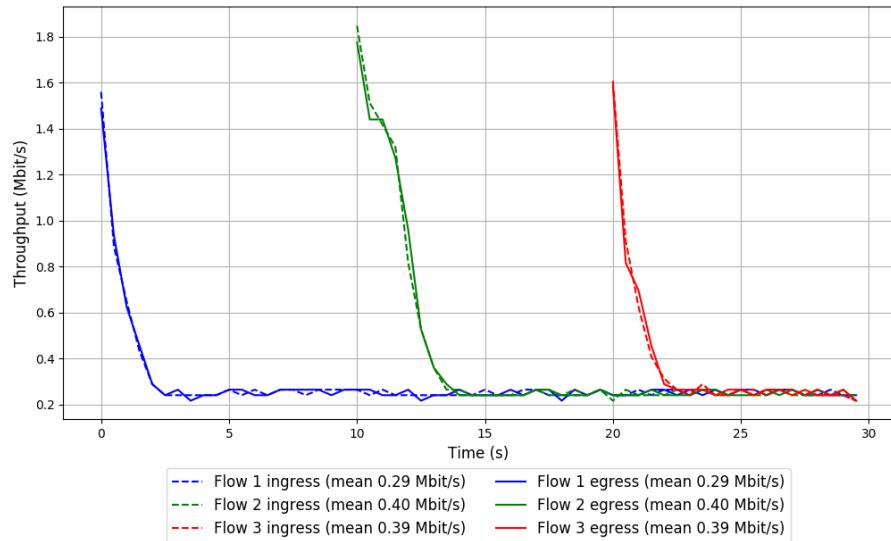


Run 2: Statistics of CalibratedKoho

```
Start at: 2017-08-13 07:08:30
End at: 2017-08-13 07:09:00
Local clock offset: -0.63 ms
Remote clock offset: -17.474 ms

# Below is generated by plot.py at 2017-08-13 07:35:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 41.319 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 41.173 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 45.220 ms
Loss rate: 0.15%
-- Flow 3:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 41.036 ms
Loss rate: 0.00%
```

Run 2: Report of CalibratedKoho — Data Link

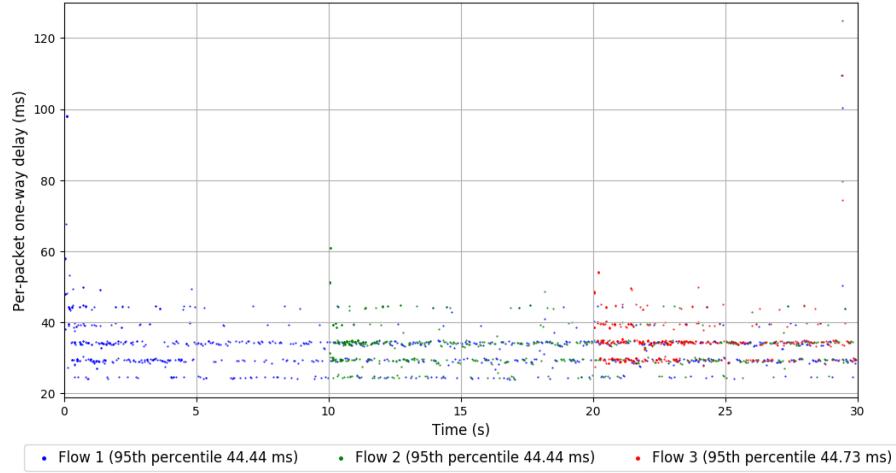
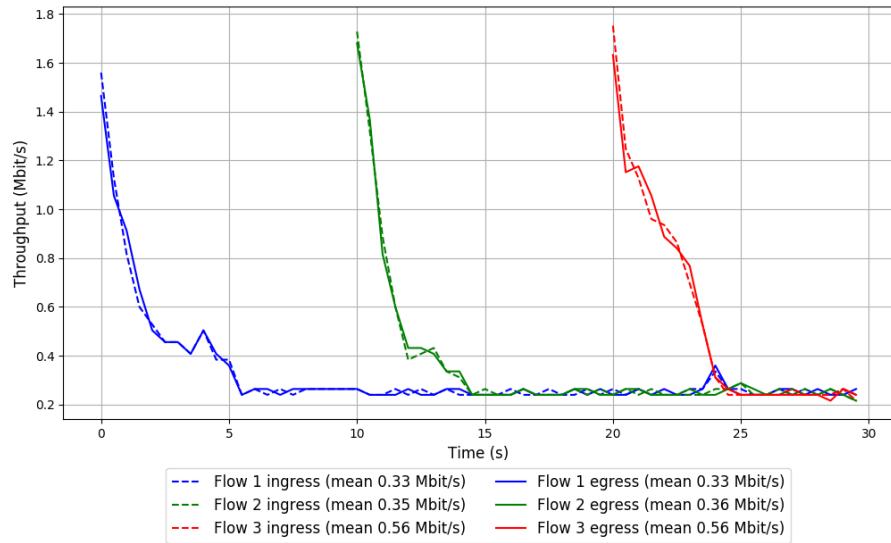


```
Run 3: Statistics of CalibratedKoho
```

```
Start at: 2017-08-13 07:27:30
End at: 2017-08-13 07:28:00
Local clock offset: -2.613 ms
Remote clock offset: -17.416 ms

# Below is generated by plot.py at 2017-08-13 07:35:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 44.478 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 44.442 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 44.443 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 44.730 ms
Loss rate: 0.65%
```

Run 3: Report of CalibratedKoho — Data Link

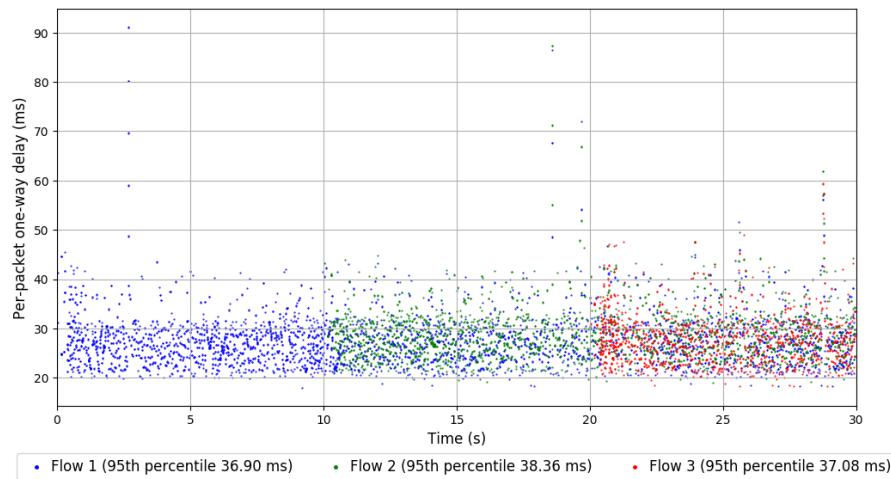
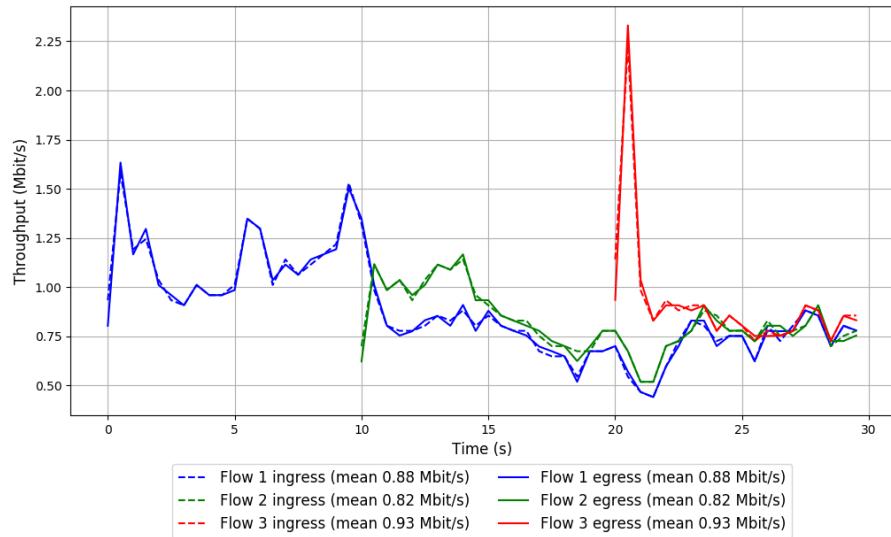


Run 1: Statistics of Copa

```
Start at: 2017-08-13 06:45:16
End at: 2017-08-13 06:45:46
Local clock offset: 1.365 ms
Remote clock offset: -19.261 ms

# Below is generated by plot.py at 2017-08-13 07:35:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 37.487 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 36.901 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 38.364 ms
Loss rate: 0.23%
-- Flow 3:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 37.082 ms
Loss rate: 0.55%
```

Run 1: Report of Copa — Data Link

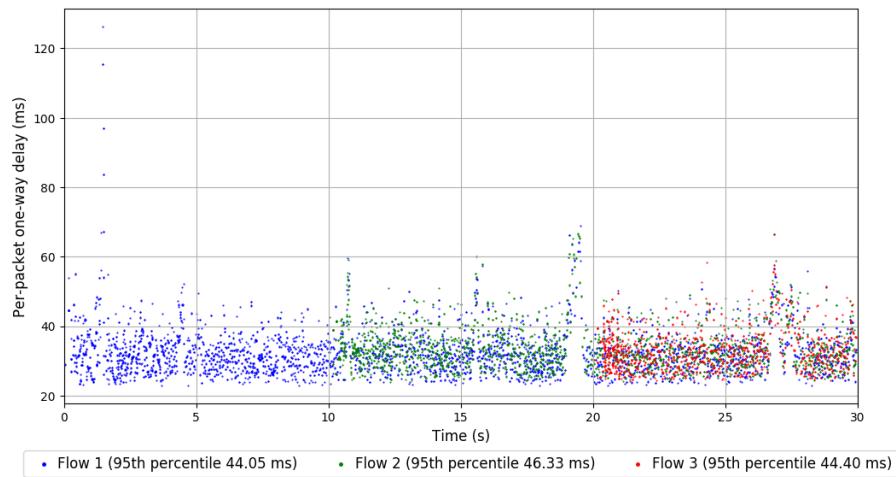
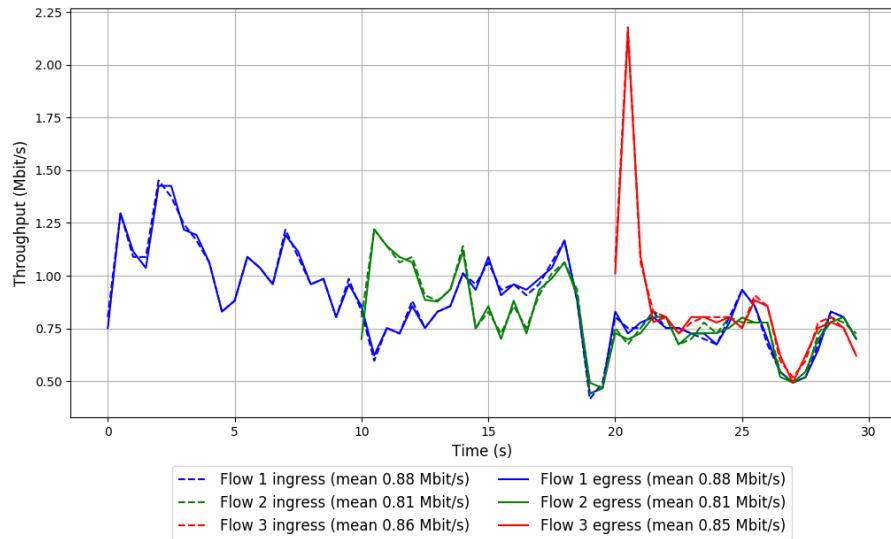


Run 2: Statistics of Copa

```
Start at: 2017-08-13 07:02:56
End at: 2017-08-13 07:03:26
Local clock offset: -1.874 ms
Remote clock offset: -16.671 ms

# Below is generated by plot.py at 2017-08-13 07:35:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 44.708 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 44.051 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 46.330 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 44.403 ms
Loss rate: 0.87%
```

Run 2: Report of Copa — Data Link

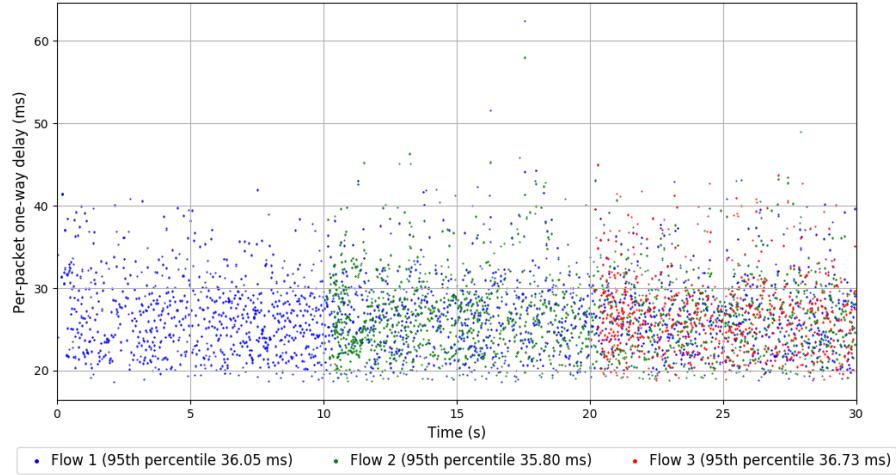
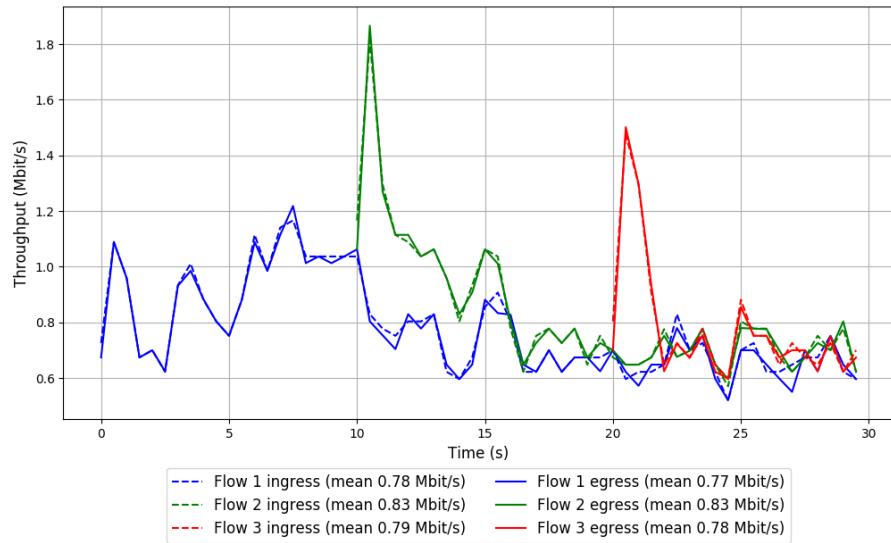


Run 3: Statistics of Copa

```
Start at: 2017-08-13 07:21:15
End at: 2017-08-13 07:21:45
Local clock offset: 1.451 ms
Remote clock offset: -18.425 ms

# Below is generated by plot.py at 2017-08-13 07:35:50
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.59 Mbit/s
95th percentile per-packet one-way delay: 36.068 ms
Loss rate: 0.61%
-- Flow 1:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 36.053 ms
Loss rate: 0.88%
-- Flow 2:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 35.803 ms
Loss rate: 0.08%
-- Flow 3:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 36.726 ms
Loss rate: 0.97%
```

Run 3: Report of Copa — Data Link

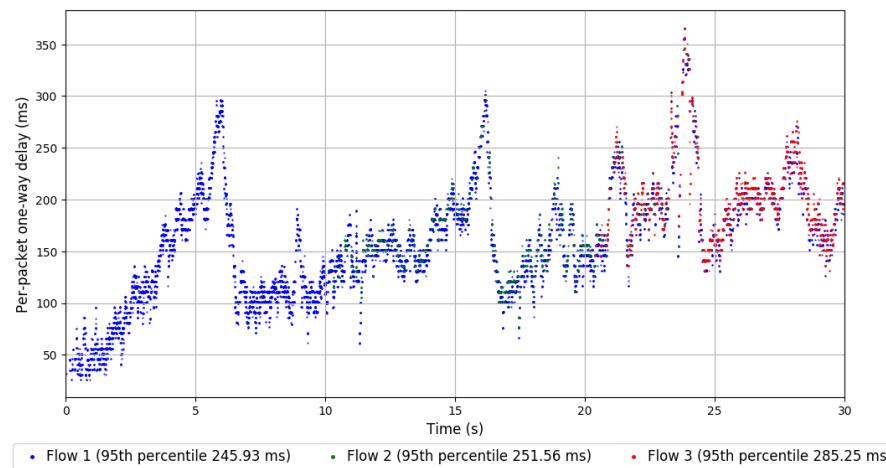
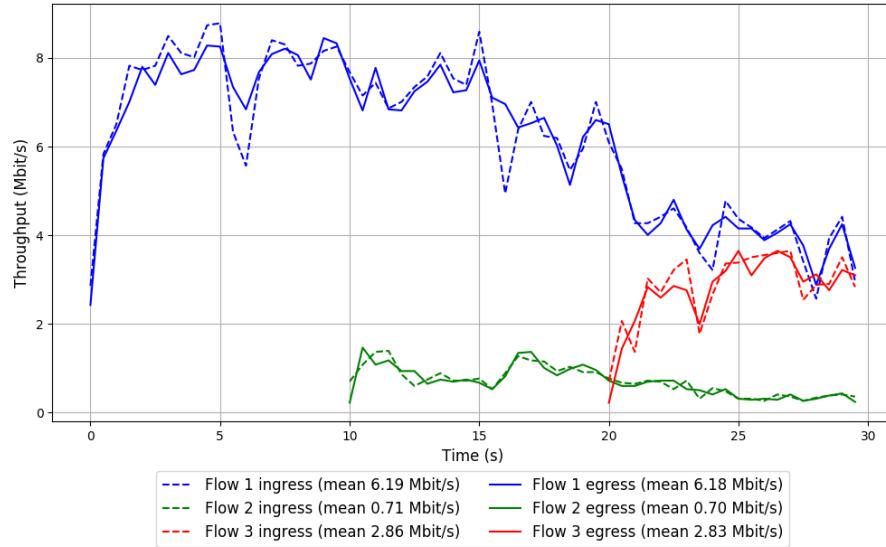


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2017-08-13 06:46:23
End at: 2017-08-13 06:46:53
Local clock offset: -2.198 ms
Remote clock offset: -19.002 ms

# Below is generated by plot.py at 2017-08-13 07:35:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.57 Mbit/s
95th percentile per-packet one-way delay: 251.549 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 6.18 Mbit/s
95th percentile per-packet one-way delay: 245.926 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 251.564 ms
Loss rate: 2.30%
-- Flow 3:
Average throughput: 2.83 Mbit/s
95th percentile per-packet one-way delay: 285.245 ms
Loss rate: 2.24%
```

Run 1: Report of TCP Cubic — Data Link

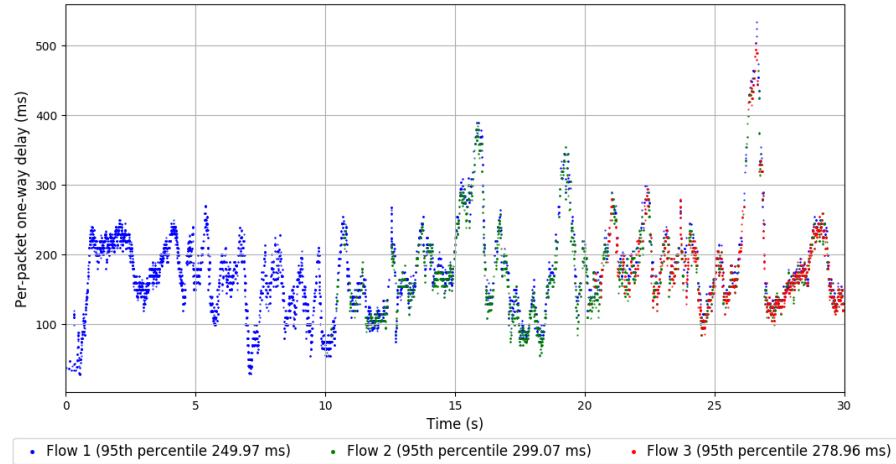
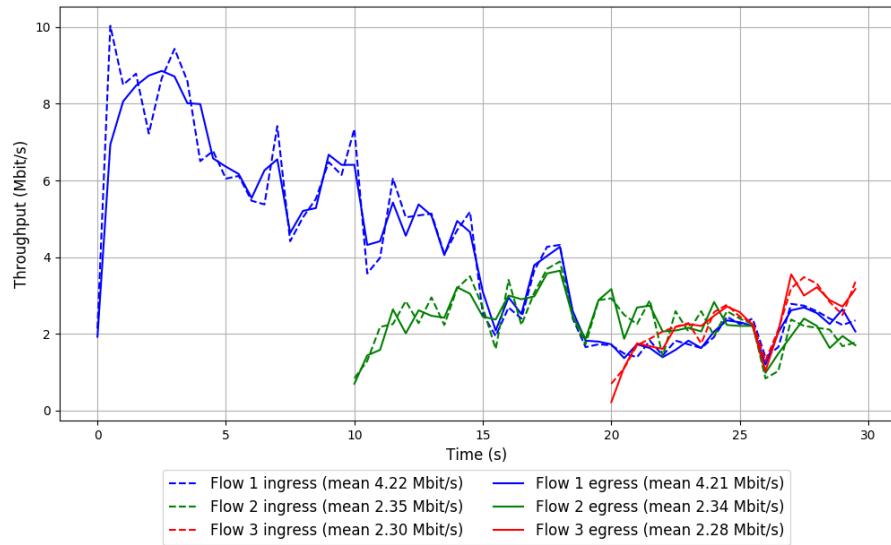


Run 2: Statistics of TCP Cubic

```
Start at: 2017-08-13 07:04:02
End at: 2017-08-13 07:04:32
Local clock offset: -0.502 ms
Remote clock offset: -17.973 ms

# Below is generated by plot.py at 2017-08-13 07:35:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.50 Mbit/s
95th percentile per-packet one-way delay: 269.410 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 4.21 Mbit/s
95th percentile per-packet one-way delay: 249.975 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 299.070 ms
Loss rate: 1.00%
-- Flow 3:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 278.964 ms
Loss rate: 2.57%
```

Run 2: Report of TCP Cubic — Data Link

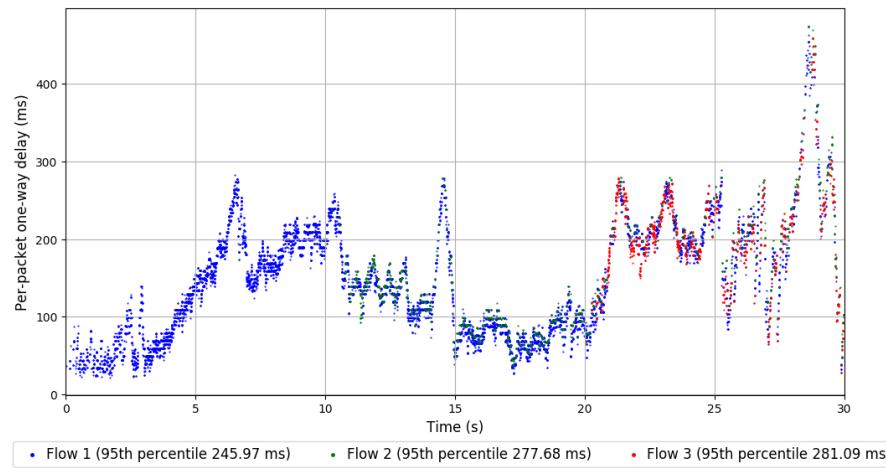
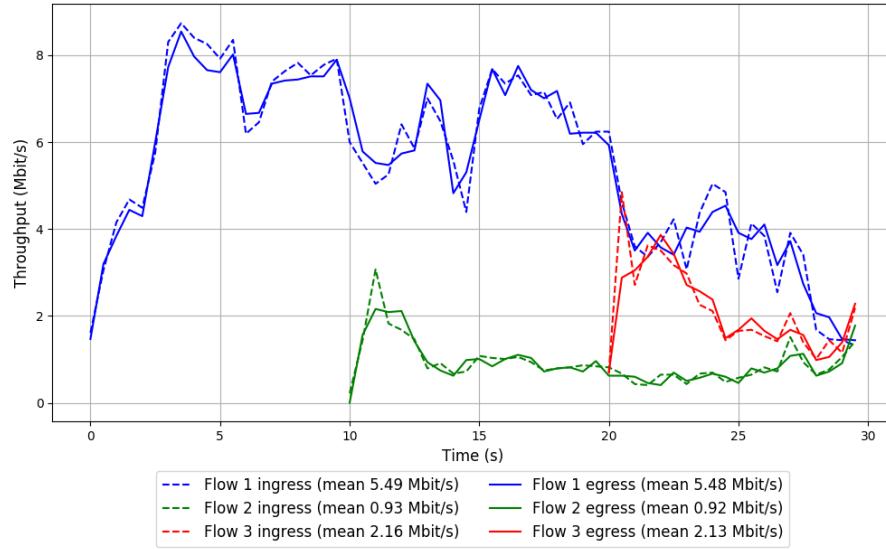


Run 3: Statistics of TCP Cubic

```
Start at: 2017-08-13 07:22:21
End at: 2017-08-13 07:22:51
Local clock offset: 0.031 ms
Remote clock offset: -18.174 ms

# Below is generated by plot.py at 2017-08-13 07:35:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.79 Mbit/s
95th percentile per-packet one-way delay: 255.671 ms
Loss rate: 0.55%
-- Flow 1:
Average throughput: 5.48 Mbit/s
95th percentile per-packet one-way delay: 245.971 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 277.679 ms
Loss rate: 1.62%
-- Flow 3:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 281.086 ms
Loss rate: 1.74%
```

Run 3: Report of TCP Cubic — Data Link

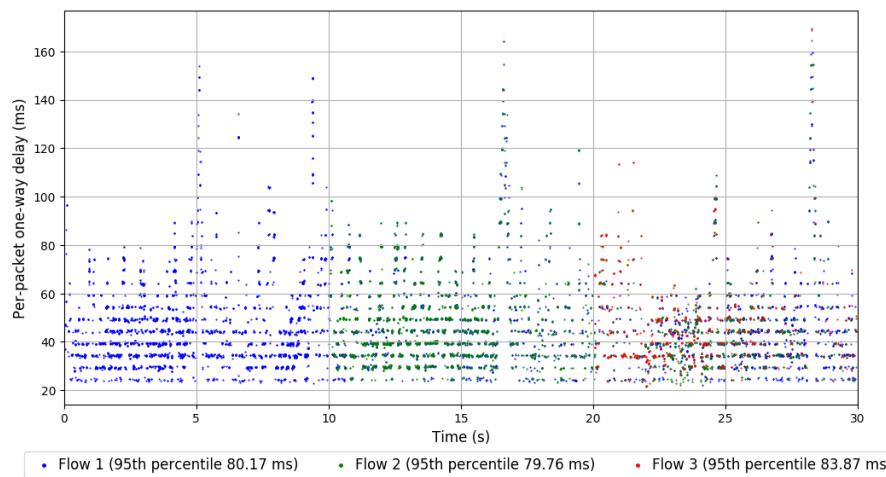
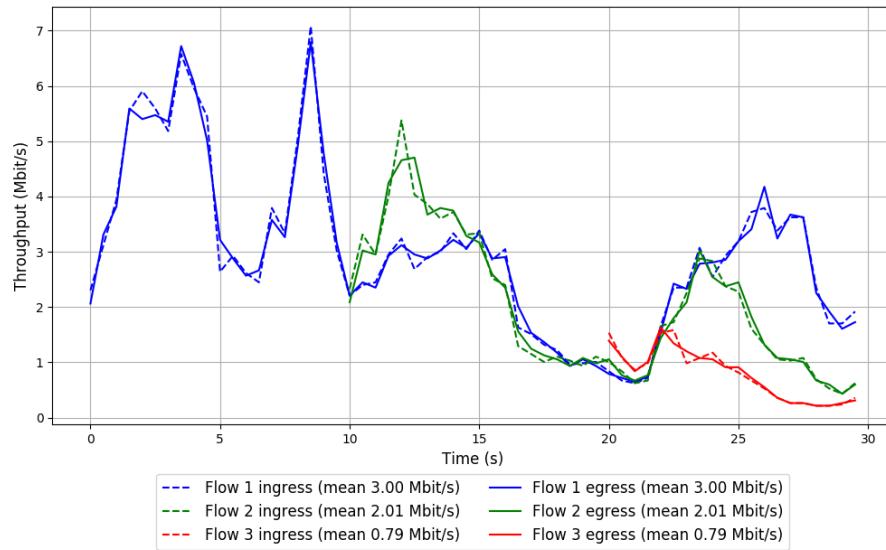


Run 1: Statistics of KohoCC

```
Start at: 2017-08-13 06:48:36
End at: 2017-08-13 06:49:06
Local clock offset: -0.697 ms
Remote clock offset: -19.557 ms

# Below is generated by plot.py at 2017-08-13 07:35:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.59 Mbit/s
95th percentile per-packet one-way delay: 79.926 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 80.169 ms
Loss rate: 0.23%
-- Flow 2:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 79.757 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 83.866 ms
Loss rate: 0.31%
```

Run 1: Report of KohoCC — Data Link

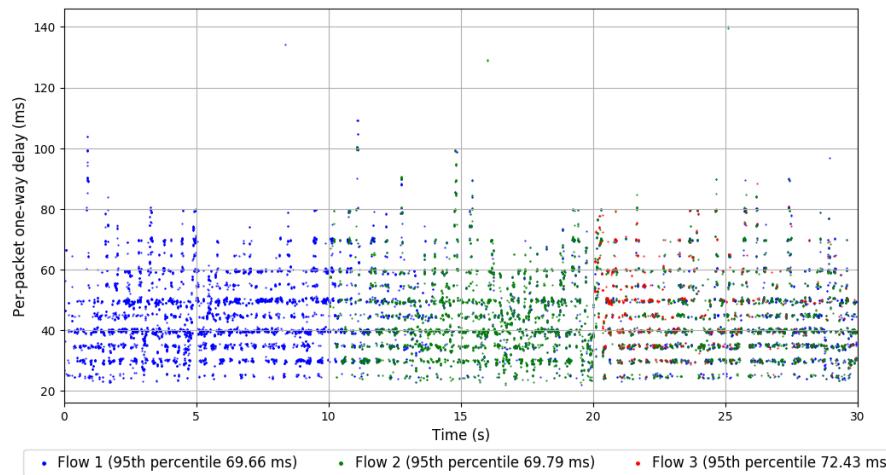
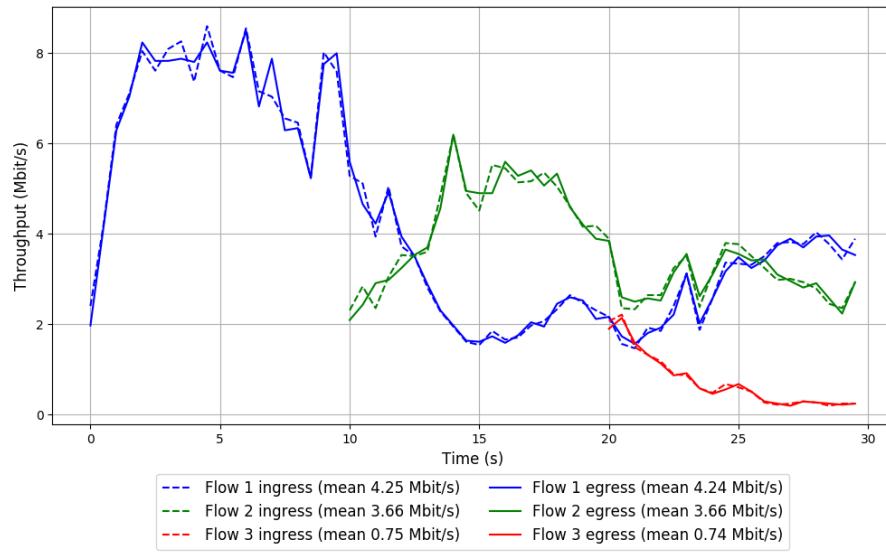


Run 2: Statistics of KohoCC

```
Start at: 2017-08-13 07:06:16
End at: 2017-08-13 07:06:46
Local clock offset: -1.756 ms
Remote clock offset: -18.993 ms

# Below is generated by plot.py at 2017-08-13 07:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.92 Mbit/s
95th percentile per-packet one-way delay: 69.766 ms
Loss rate: 0.27%
-- Flow 1:
Average throughput: 4.24 Mbit/s
95th percentile per-packet one-way delay: 69.657 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 3.66 Mbit/s
95th percentile per-packet one-way delay: 69.794 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 72.429 ms
Loss rate: 1.46%
```

Run 2: Report of KohoCC — Data Link

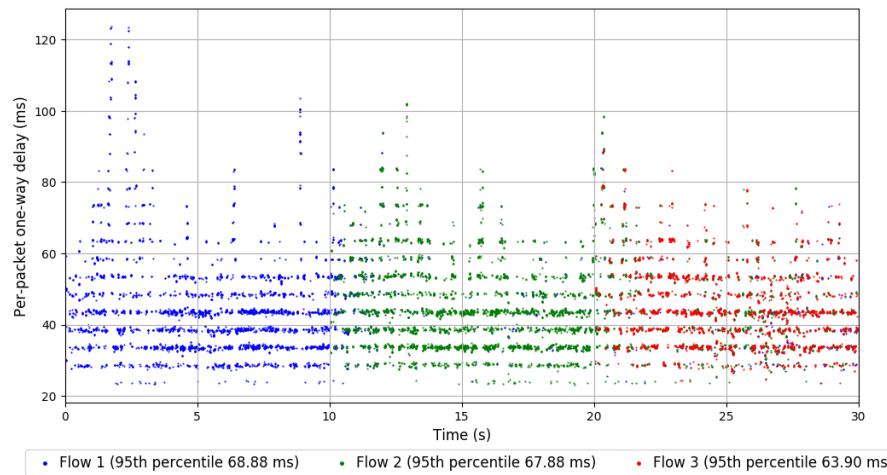
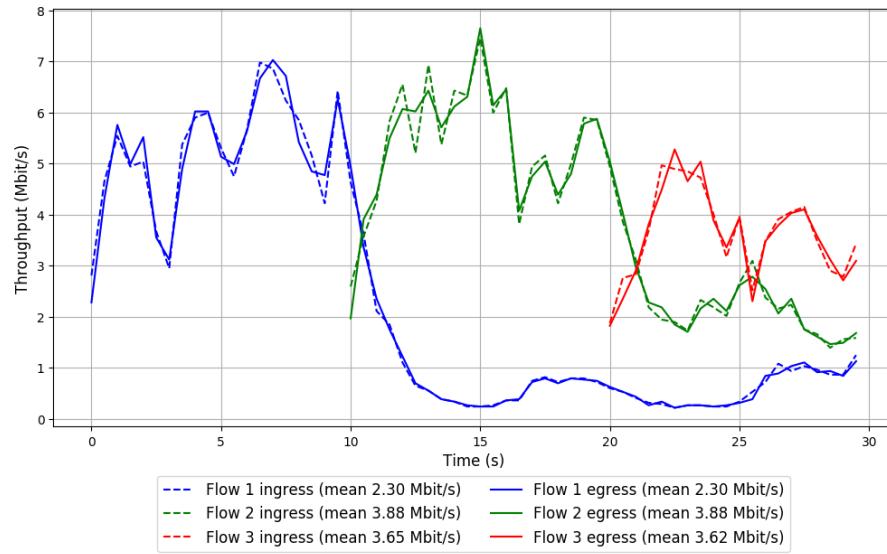


Run 3: Statistics of KohoCC

```
Start at: 2017-08-13 07:24:56
End at: 2017-08-13 07:25:26
Local clock offset: -2.438 ms
Remote clock offset: -17.143 ms

# Below is generated by plot.py at 2017-08-13 07:35:56
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.07 Mbit/s
95th percentile per-packet one-way delay: 68.005 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 68.878 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 3.88 Mbit/s
95th percentile per-packet one-way delay: 67.876 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 3.62 Mbit/s
95th percentile per-packet one-way delay: 63.899 ms
Loss rate: 0.96%
```

Run 3: Report of KohoCC — Data Link

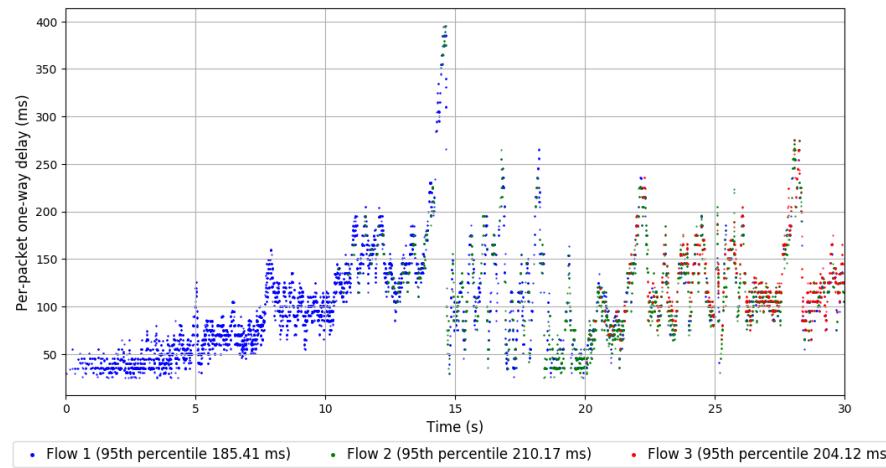
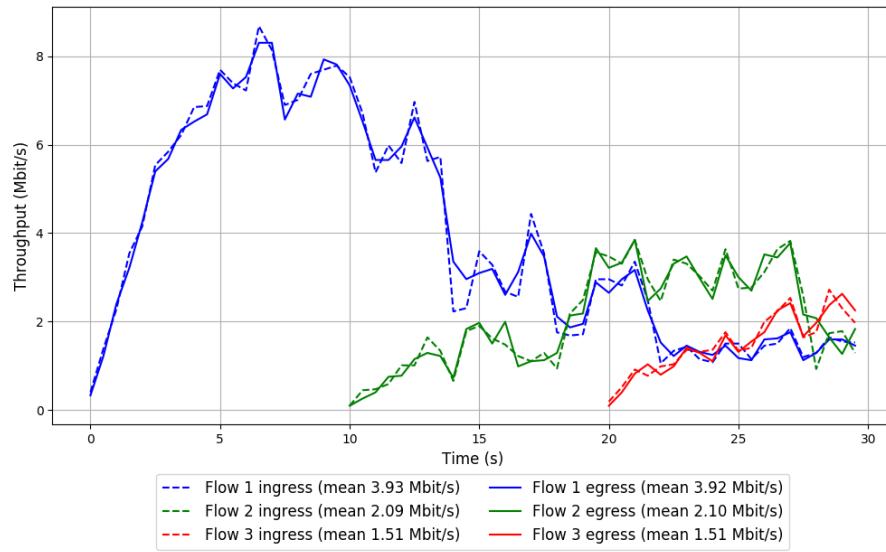


Run 1: Statistics of LEDBAT

```
Start at: 2017-08-13 06:44:09
End at: 2017-08-13 06:44:39
Local clock offset: -2.401 ms
Remote clock offset: -19.054 ms

# Below is generated by plot.py at 2017-08-13 07:35:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.81 Mbit/s
95th percentile per-packet one-way delay: 195.010 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 3.92 Mbit/s
95th percentile per-packet one-way delay: 185.415 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 210.172 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 204.115 ms
Loss rate: 1.01%
```

Run 1: Report of LEDBAT — Data Link

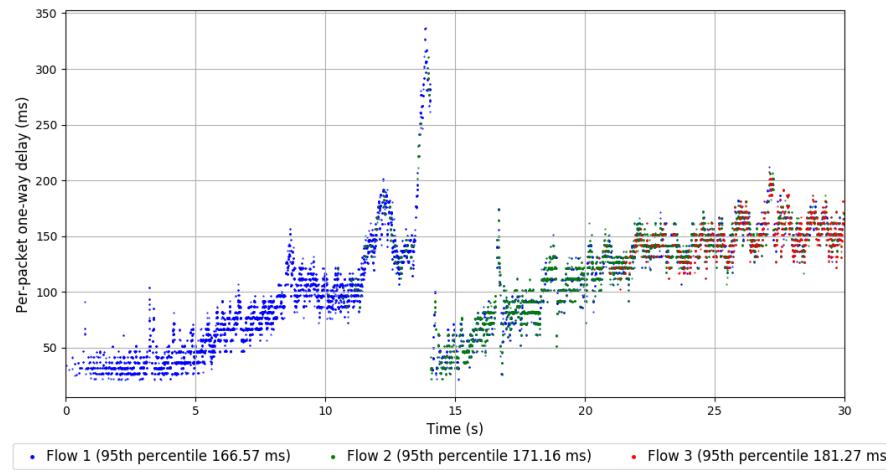
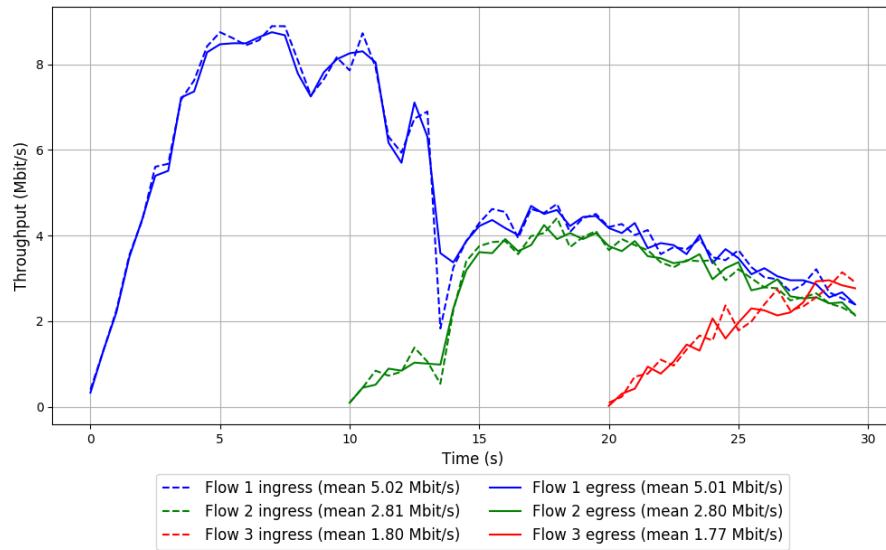


Run 2: Statistics of LEDBAT

```
Start at: 2017-08-13 07:01:49
End at: 2017-08-13 07:02:19
Local clock offset: 0.428 ms
Remote clock offset: -19.151 ms

# Below is generated by plot.py at 2017-08-13 07:35:58
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.46 Mbit/s
95th percentile per-packet one-way delay: 170.651 ms
Loss rate: 0.60%
-- Flow 1:
Average throughput: 5.01 Mbit/s
95th percentile per-packet one-way delay: 166.571 ms
Loss rate: 0.32%
-- Flow 2:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 171.162 ms
Loss rate: 0.65%
-- Flow 3:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 181.267 ms
Loss rate: 2.76%
```

Run 2: Report of LEDBAT — Data Link

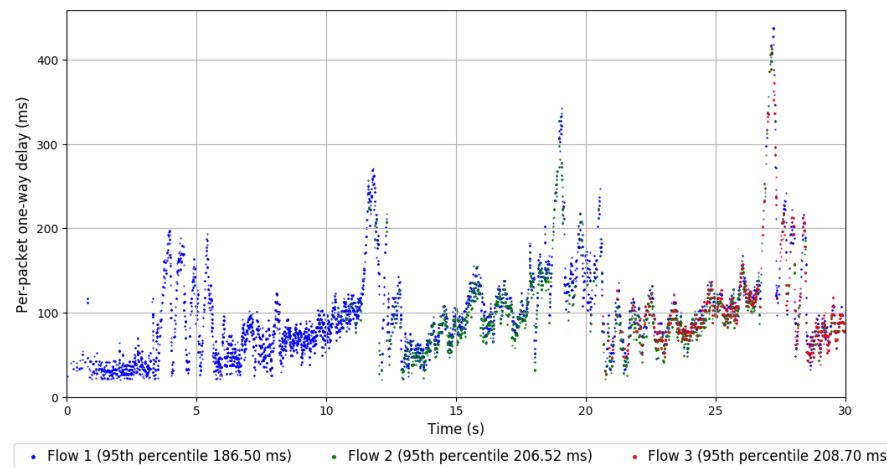
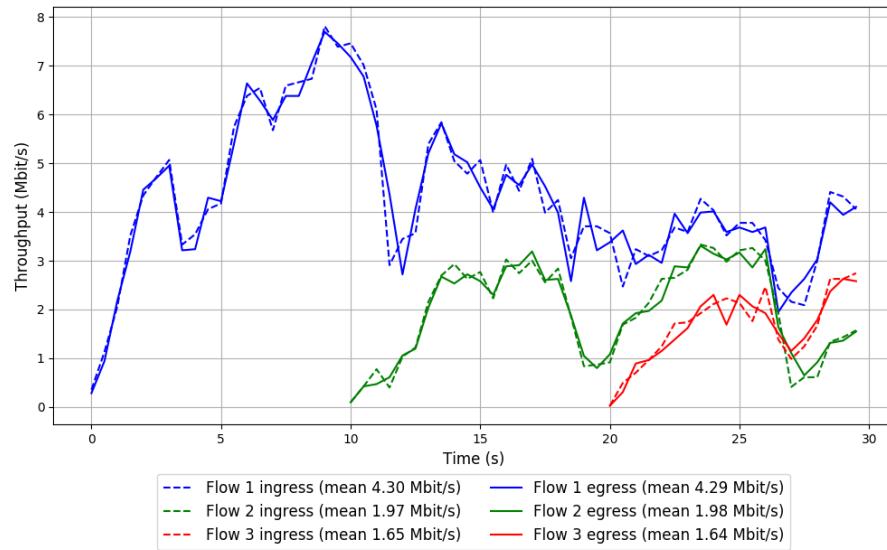


Run 3: Statistics of LEDBAT

```
Start at: 2017-08-13 07:20:09
End at: 2017-08-13 07:20:39
Local clock offset: 0.653 ms
Remote clock offset: -17.992 ms

# Below is generated by plot.py at 2017-08-13 07:35:59
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.14 Mbit/s
95th percentile per-packet one-way delay: 192.958 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 186.504 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 206.524 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 208.698 ms
Loss rate: 2.08%
```

Run 3: Report of LEDBAT — Data Link

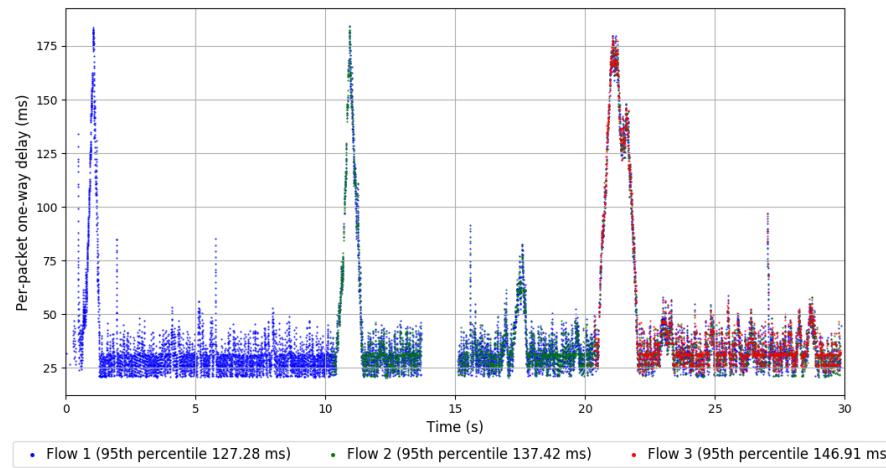
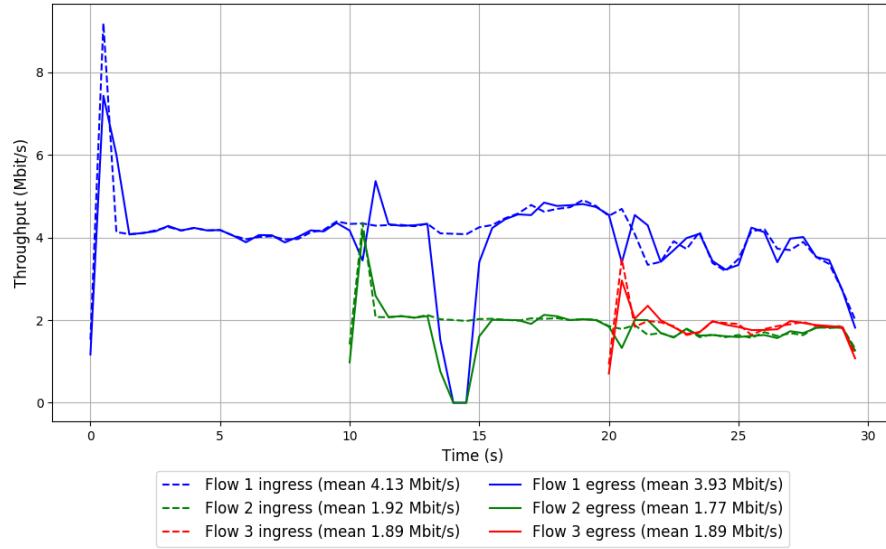


Run 1: Statistics of PCC

```
Start at: 2017-08-13 06:53:23
End at: 2017-08-13 06:53:53
Local clock offset: 0.226 ms
Remote clock offset: -18.064 ms

# Below is generated by plot.py at 2017-08-13 07:36:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.73 Mbit/s
95th percentile per-packet one-way delay: 133.777 ms
Loss rate: 5.00%
-- Flow 1:
Average throughput: 3.93 Mbit/s
95th percentile per-packet one-way delay: 127.278 ms
Loss rate: 4.83%
-- Flow 2:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 137.421 ms
Loss rate: 7.70%
-- Flow 3:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 146.910 ms
Loss rate: 0.59%
```

Run 1: Report of PCC — Data Link

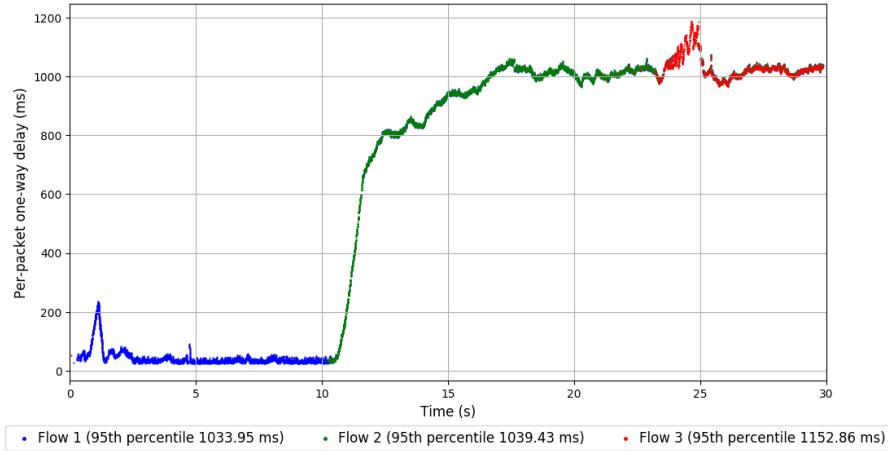
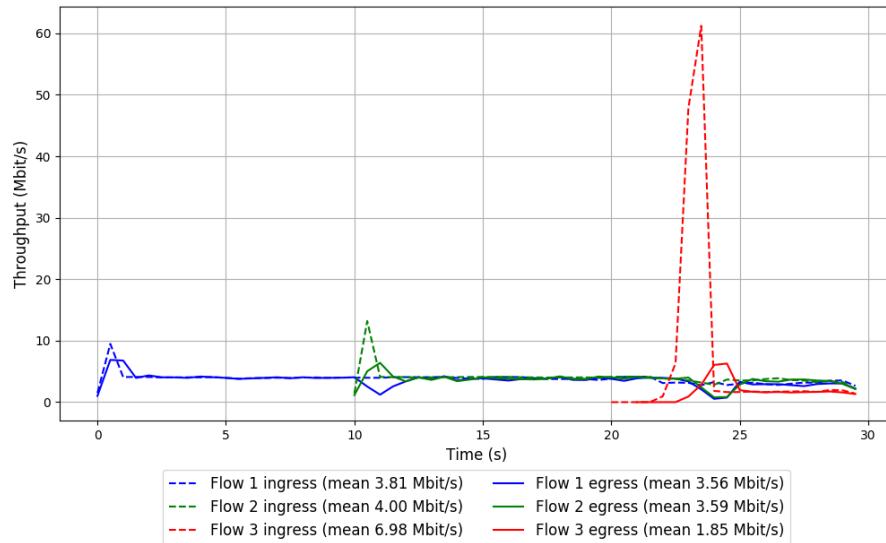


Run 2: Statistics of PCC

```
Start at: 2017-08-13 07:10:42
End at: 2017-08-13 07:11:12
Local clock offset: -1.323 ms
Remote clock offset: -16.637 ms

# Below is generated by plot.py at 2017-08-13 07:36:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.49 Mbit/s
95th percentile per-packet one-way delay: 1048.284 ms
Loss rate: 26.06%
-- Flow 1:
Average throughput: 3.56 Mbit/s
95th percentile per-packet one-way delay: 1033.950 ms
Loss rate: 6.74%
-- Flow 2:
Average throughput: 3.59 Mbit/s
95th percentile per-packet one-way delay: 1039.434 ms
Loss rate: 10.40%
-- Flow 3:
Average throughput: 1.85 Mbit/s
95th percentile per-packet one-way delay: 1152.855 ms
Loss rate: 76.27%
```

Run 2: Report of PCC — Data Link

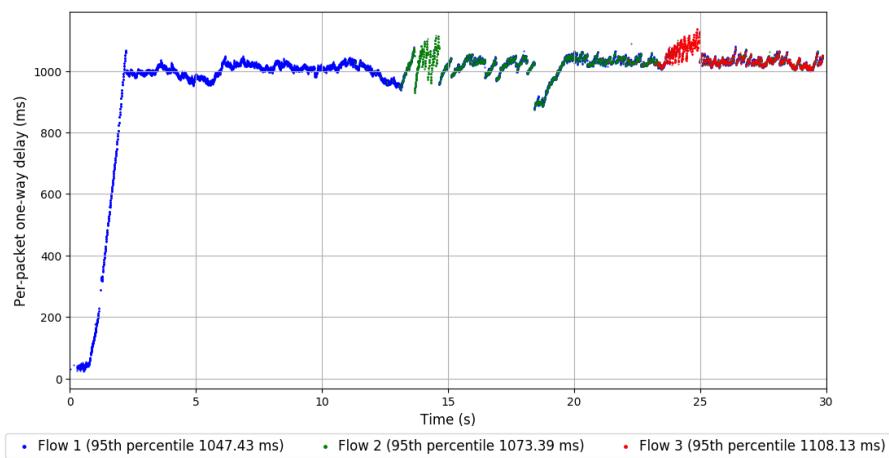
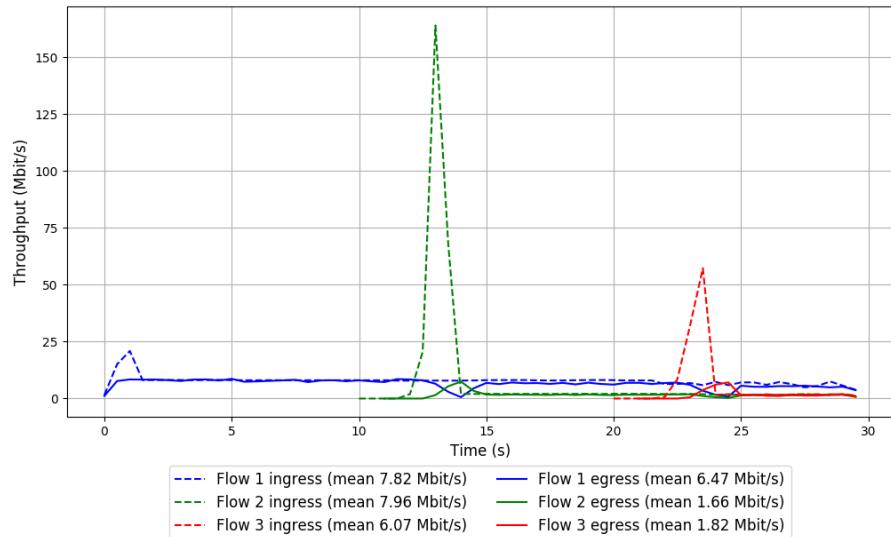


Run 3: Statistics of PCC

```
Start at: 2017-08-13 07:30:24
End at: 2017-08-13 07:30:54
Local clock offset: -0.468 ms
Remote clock offset: -18.721 ms

# Below is generated by plot.py at 2017-08-13 07:36:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.05 Mbit/s
95th percentile per-packet one-way delay: 1059.247 ms
Loss rate: 46.78%
-- Flow 1:
Average throughput: 6.47 Mbit/s
95th percentile per-packet one-way delay: 1047.433 ms
Loss rate: 17.43%
-- Flow 2:
Average throughput: 1.66 Mbit/s
95th percentile per-packet one-way delay: 1073.394 ms
Loss rate: 80.23%
-- Flow 3:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 1108.128 ms
Loss rate: 73.18%
```

Run 3: Report of PCC — Data Link

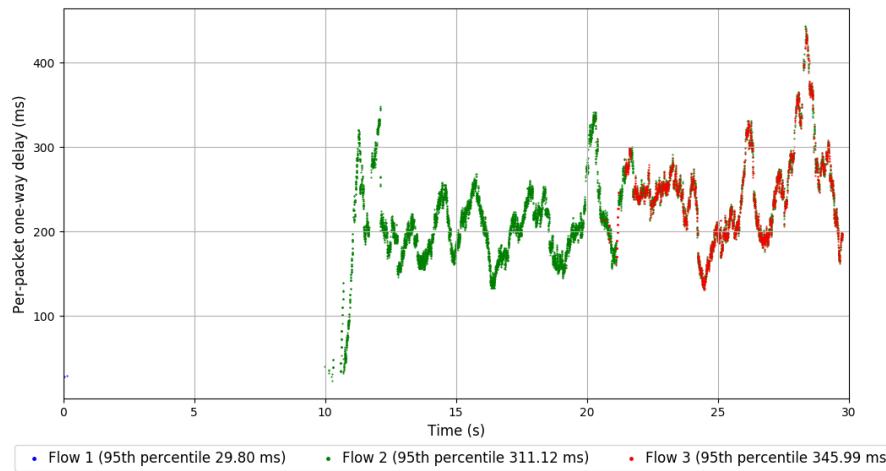
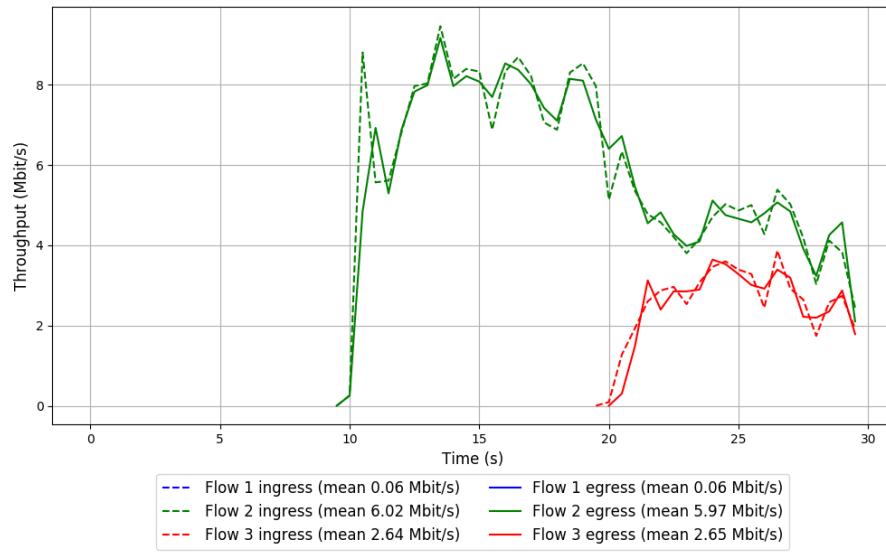


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2017-08-13 06:49:43
End at: 2017-08-13 06:50:13
Local clock offset: -1.519 ms
Remote clock offset: -19.452 ms

# Below is generated by plot.py at 2017-08-13 07:36:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.82 Mbit/s
95th percentile per-packet one-way delay: 316.953 ms
Loss rate: 1.36%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 29.805 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 5.97 Mbit/s
95th percentile per-packet one-way delay: 311.117 ms
Loss rate: 0.97%
-- Flow 3:
Average throughput: 2.65 Mbit/s
95th percentile per-packet one-way delay: 345.993 ms
Loss rate: 3.18%
```

Run 1: Report of QUIC Cubic — Data Link

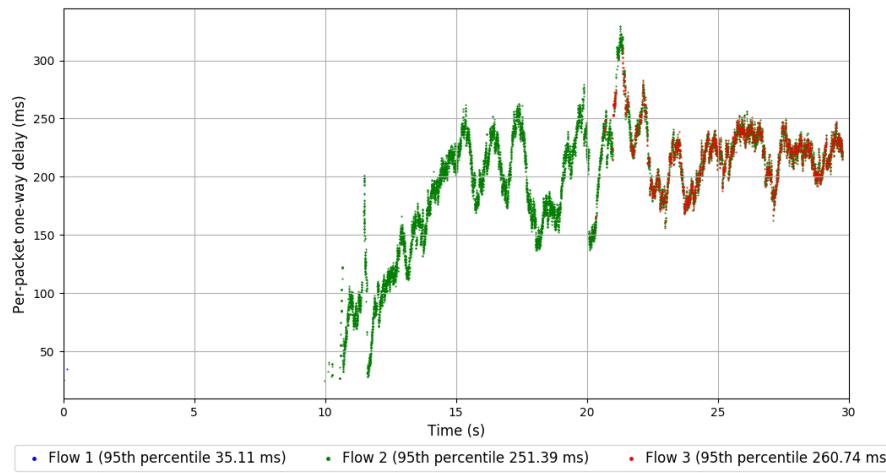
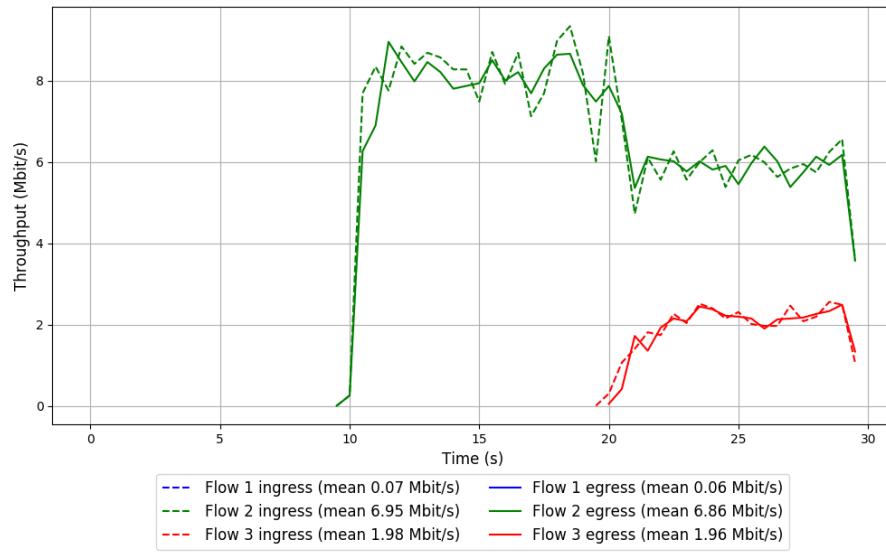


Run 2: Statistics of QUIC Cubic

```
Start at: 2017-08-13 07:07:23
End at: 2017-08-13 07:07:53
Local clock offset: -2.664 ms
Remote clock offset: -18.232 ms

# Below is generated by plot.py at 2017-08-13 07:36:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.20 Mbit/s
95th percentile per-packet one-way delay: 252.137 ms
Loss rate: 1.47%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 35.108 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 6.86 Mbit/s
95th percentile per-packet one-way delay: 251.389 ms
Loss rate: 1.33%
-- Flow 3:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 260.740 ms
Loss rate: 2.45%
```

Run 2: Report of QUIC Cubic — Data Link

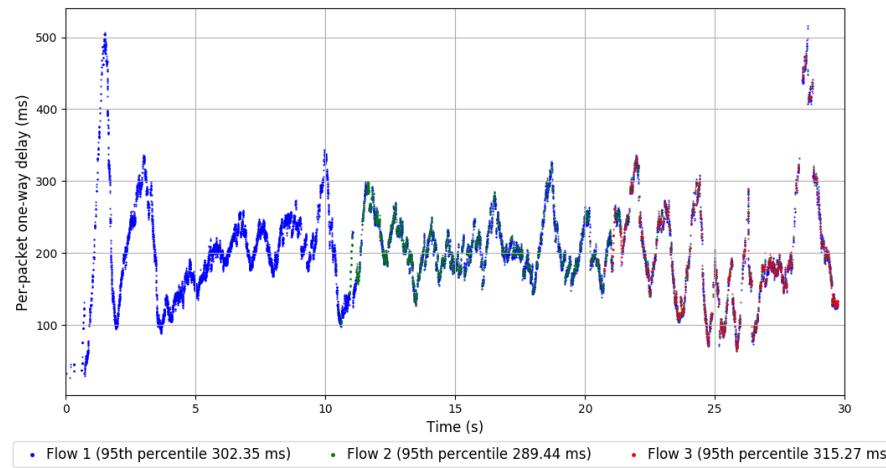
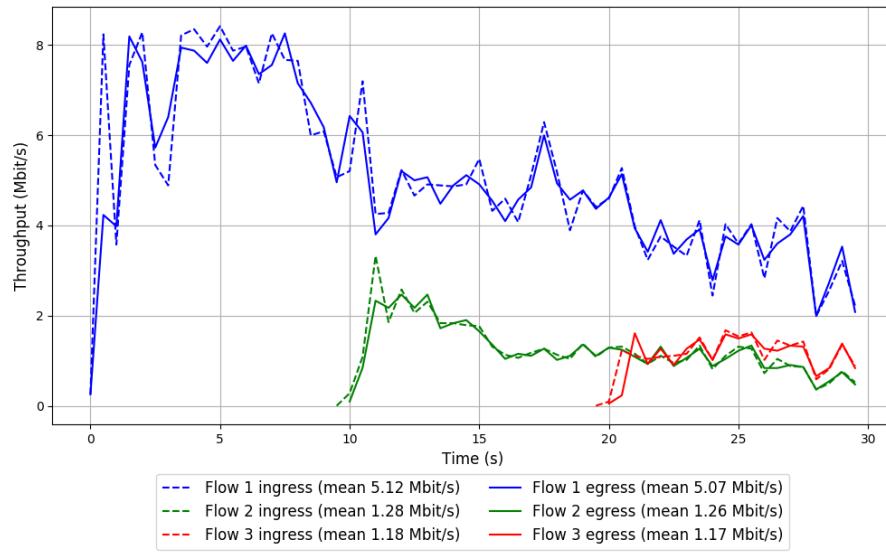


Run 3: Statistics of QUIC Cubic

```
Start at: 2017-08-13 07:26:24
End at: 2017-08-13 07:26:54
Local clock offset: -1.886 ms
Remote clock offset: -18.007 ms

# Below is generated by plot.py at 2017-08-13 07:36:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.27 Mbit/s
95th percentile per-packet one-way delay: 300.635 ms
Loss rate: 1.45%
-- Flow 1:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 302.346 ms
Loss rate: 1.12%
-- Flow 2:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 289.435 ms
Loss rate: 2.51%
-- Flow 3:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 315.269 ms
Loss rate: 3.53%
```

Run 3: Report of QUIC Cubic — Data Link

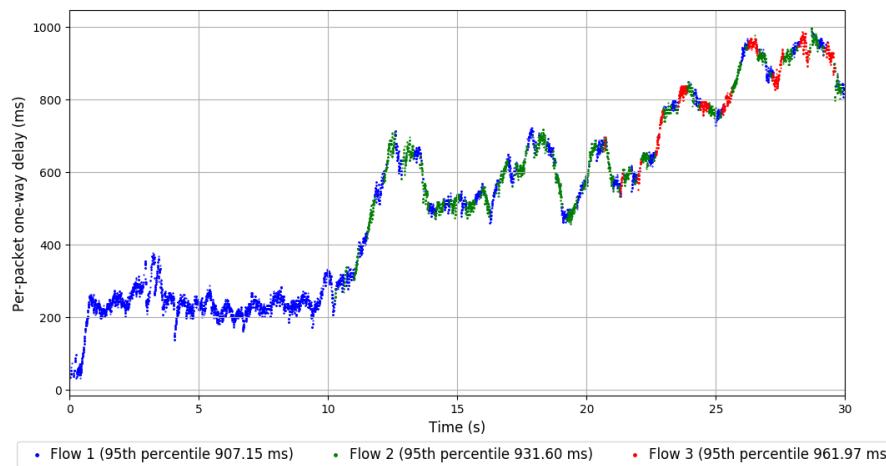
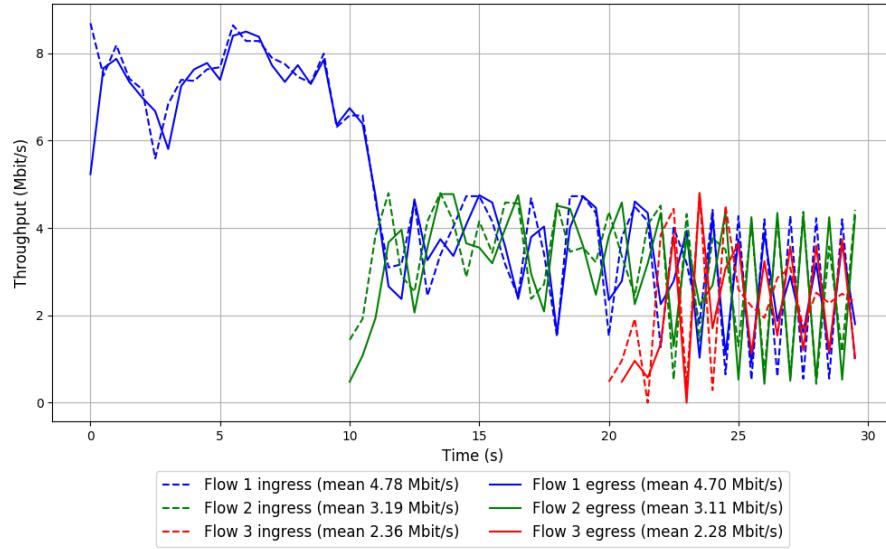


Run 1: Statistics of Saturator

```
Start at: 2017-08-13 06:47:30
End at: 2017-08-13 06:48:00
Local clock offset: 0.946 ms
Remote clock offset: -20.192 ms

# Below is generated by plot.py at 2017-08-13 07:36:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.42 Mbit/s
95th percentile per-packet one-way delay: 940.778 ms
Loss rate: 3.29%
-- Flow 1:
Average throughput: 4.70 Mbit/s
95th percentile per-packet one-way delay: 907.153 ms
Loss rate: 1.72%
-- Flow 2:
Average throughput: 3.11 Mbit/s
95th percentile per-packet one-way delay: 931.598 ms
Loss rate: 4.13%
-- Flow 3:
Average throughput: 2.28 Mbit/s
95th percentile per-packet one-way delay: 961.968 ms
Loss rate: 10.84%
```

Run 1: Report of Saturator — Data Link

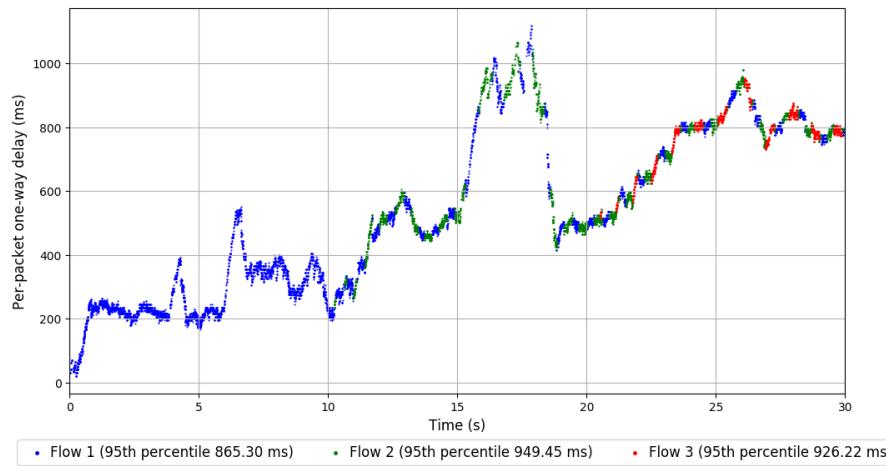
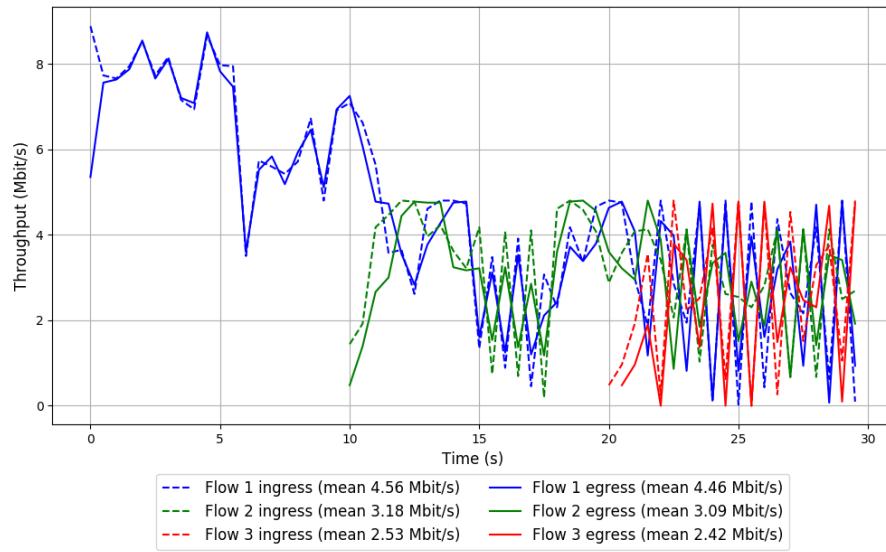


Run 2: Statistics of Saturator

```
Start at: 2017-08-13 07:05:09
End at: 2017-08-13 07:05:39
Local clock offset: 1.247 ms
Remote clock offset: -20.427 ms

# Below is generated by plot.py at 2017-08-13 07:36:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.24 Mbit/s
95th percentile per-packet one-way delay: 915.068 ms
Loss rate: 3.77%
-- Flow 1:
Average throughput: 4.46 Mbit/s
95th percentile per-packet one-way delay: 865.297 ms
Loss rate: 2.36%
-- Flow 2:
Average throughput: 3.09 Mbit/s
95th percentile per-packet one-way delay: 949.450 ms
Loss rate: 4.29%
-- Flow 3:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 926.224 ms
Loss rate: 10.08%
```

Run 2: Report of Saturator — Data Link

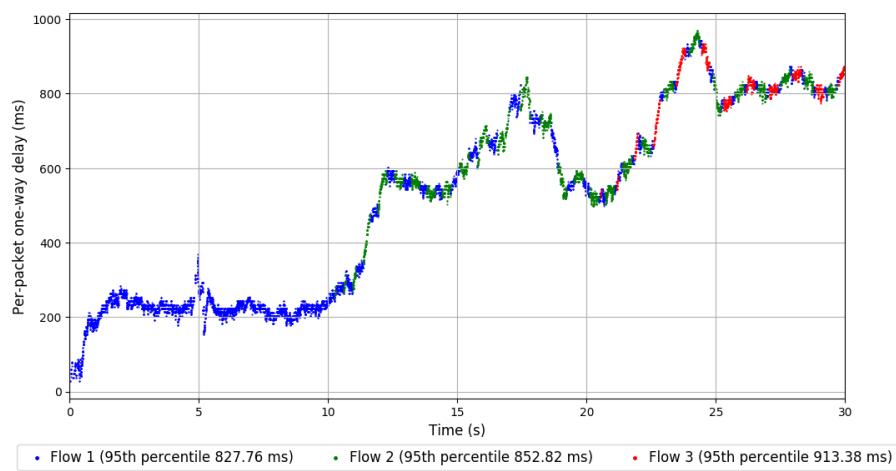
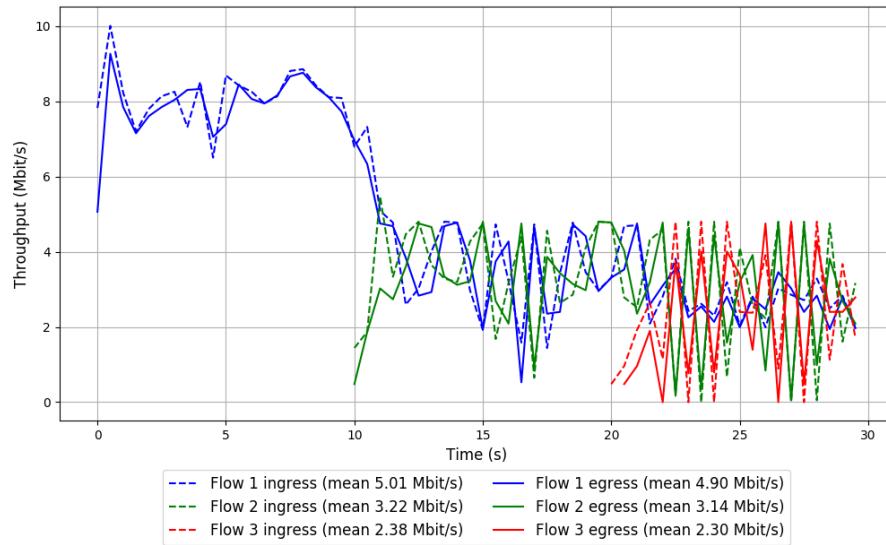


Run 3: Statistics of Saturator

```
Start at: 2017-08-13 07:23:49
End at: 2017-08-13 07:24:19
Local clock offset: -1.84 ms
Remote clock offset: -16.891 ms

# Below is generated by plot.py at 2017-08-13 07:36:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.63 Mbit/s
95th percentile per-packet one-way delay: 853.402 ms
Loss rate: 3.62%
-- Flow 1:
Average throughput: 4.90 Mbit/s
95th percentile per-packet one-way delay: 827.764 ms
Loss rate: 2.66%
-- Flow 2:
Average throughput: 3.14 Mbit/s
95th percentile per-packet one-way delay: 852.819 ms
Loss rate: 4.18%
-- Flow 3:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 913.377 ms
Loss rate: 8.23%
```

Run 3: Report of Saturator — Data Link

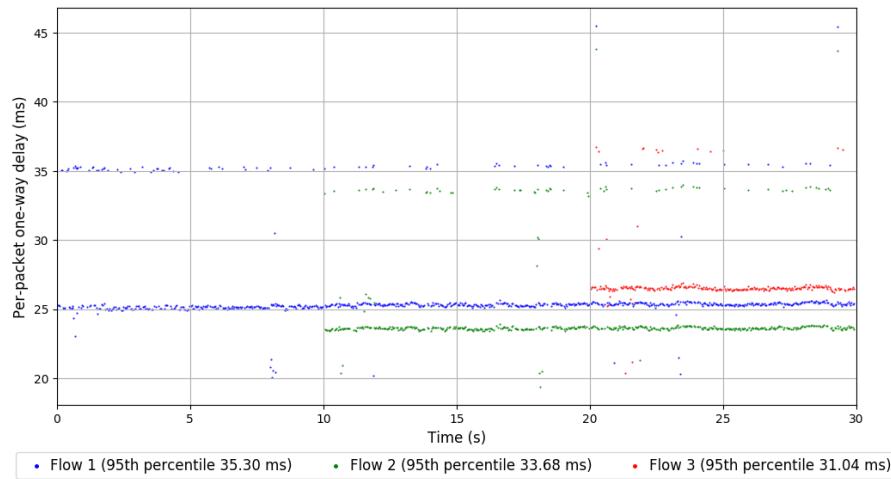
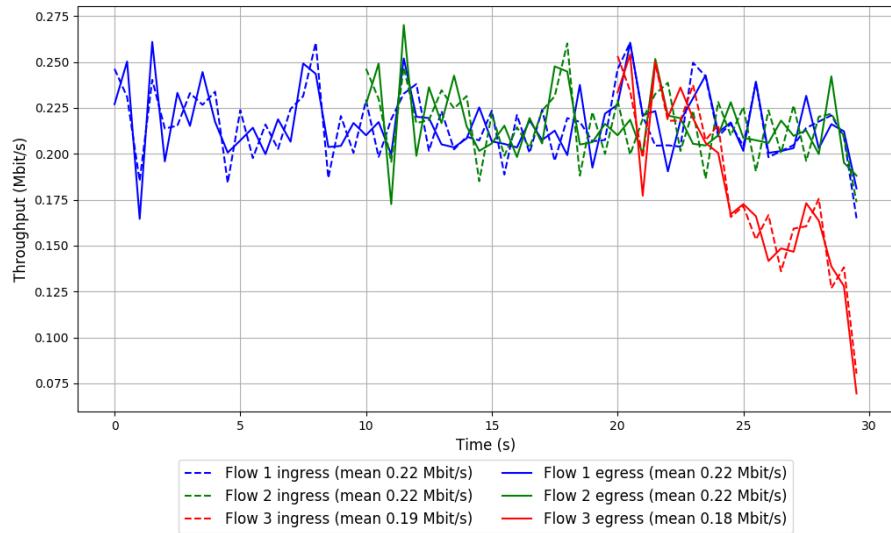


Run 1: Statistics of SCReAM

```
Start at: 2017-08-13 06:40:10
End at: 2017-08-13 06:40:40
Local clock offset: 0.704 ms
Remote clock offset: -19.264 ms

# Below is generated by plot.py at 2017-08-13 07:36:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 35.161 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 35.295 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 33.676 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 31.035 ms
Loss rate: 1.45%
```

Run 1: Report of SCReAM — Data Link

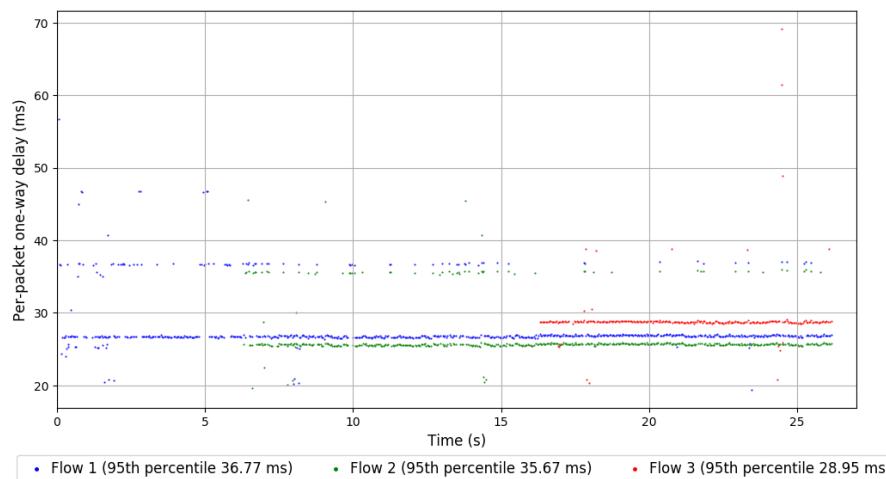
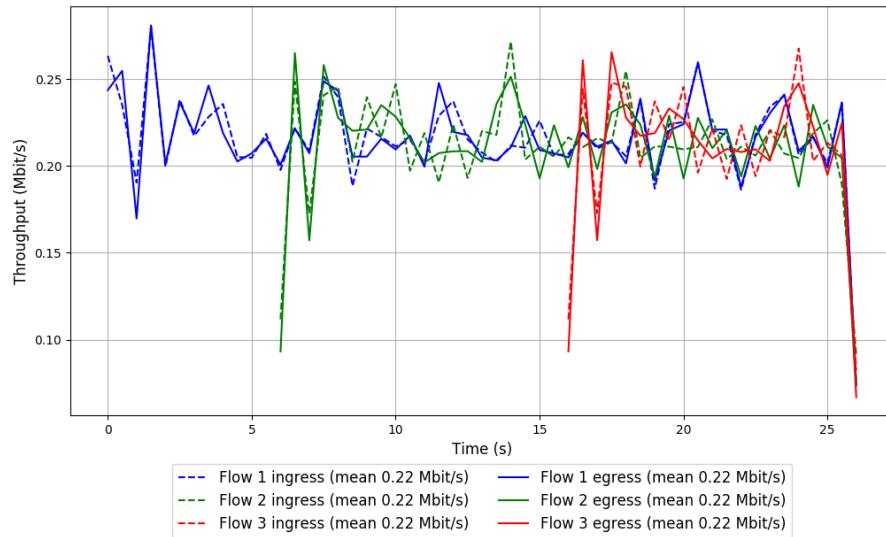


Run 2: Statistics of SCReAM

```
Start at: 2017-08-13 06:58:31
End at: 2017-08-13 06:59:01
Local clock offset: -0.05 ms
Remote clock offset: -19.975 ms

# Below is generated by plot.py at 2017-08-13 07:36:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 36.681 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 36.768 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 35.669 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 28.946 ms
Loss rate: 0.35%
```

Run 2: Report of SCReAM — Data Link

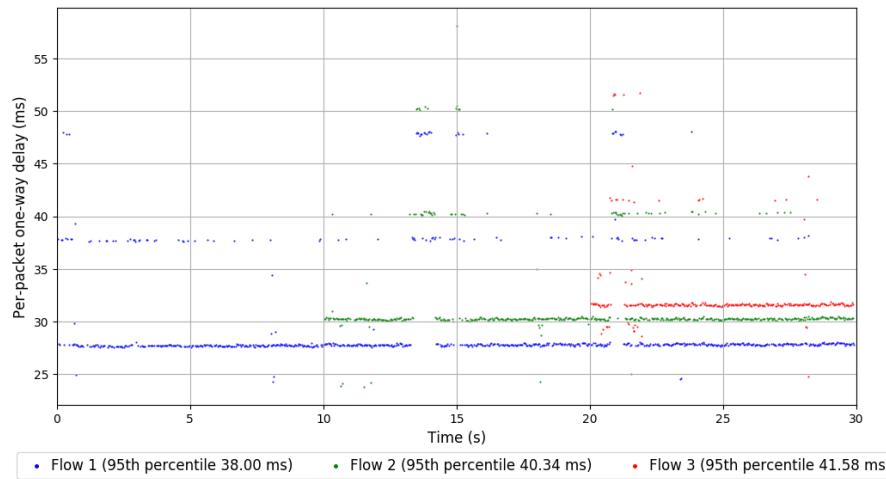
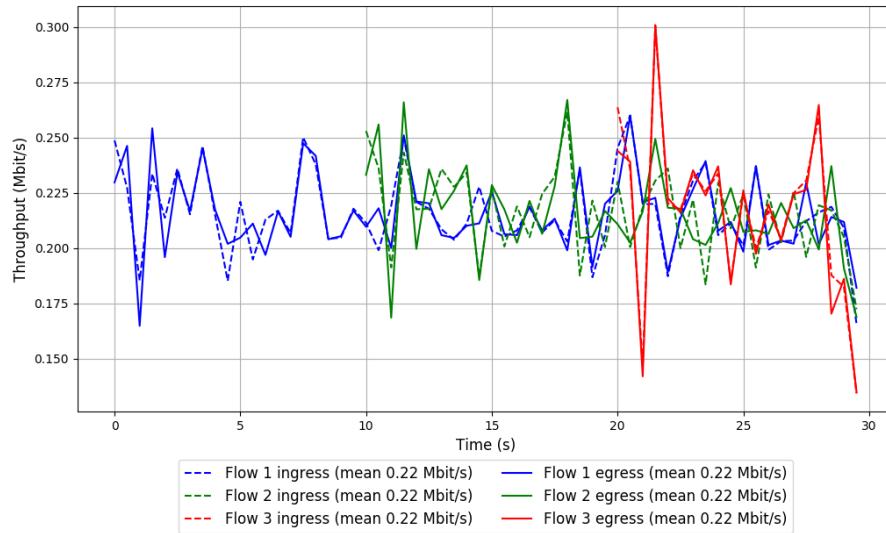


Run 3: Statistics of SCReAM

```
Start at: 2017-08-13 07:16:10
End at: 2017-08-13 07:16:40
Local clock offset: -2.023 ms
Remote clock offset: -17.701 ms

# Below is generated by plot.py at 2017-08-13 07:36:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 40.329 ms
Loss rate: 0.18%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 38.004 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 40.336 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 41.582 ms
Loss rate: 0.69%
```

Run 3: Report of SCReAM — Data Link

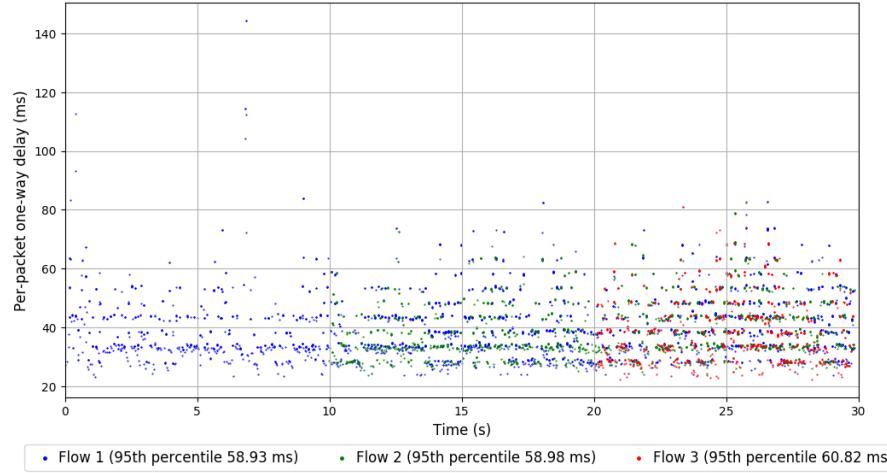
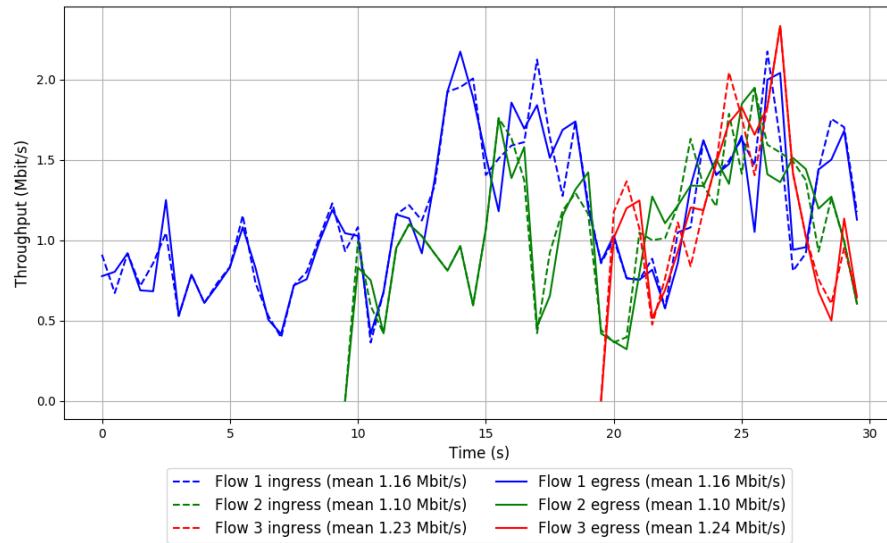


Run 1: Statistics of Sprout

```
Start at: 2017-08-13 06:42:22
End at: 2017-08-13 06:42:52
Local clock offset: -2.421 ms
Remote clock offset: -19.648 ms

# Below is generated by plot.py at 2017-08-13 07:36:11
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.30 Mbit/s
95th percentile per-packet one-way delay: 59.228 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 58.926 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 58.982 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 60.821 ms
Loss rate: 0.01%
```

Run 1: Report of Sprout — Data Link

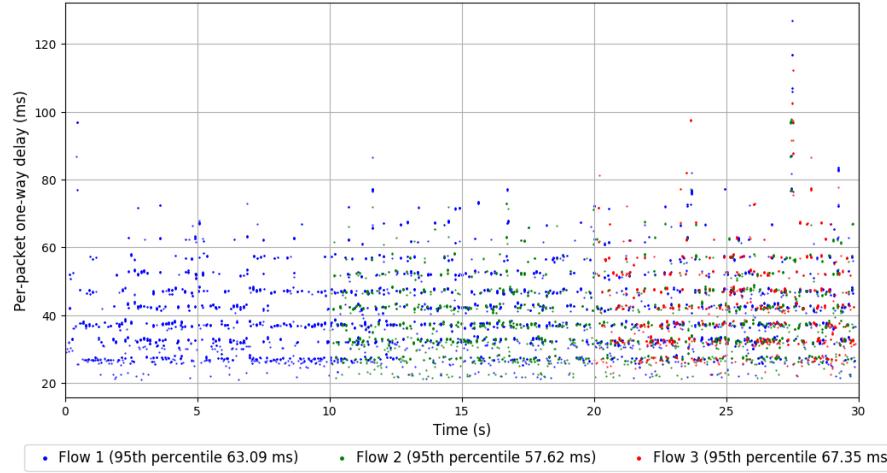
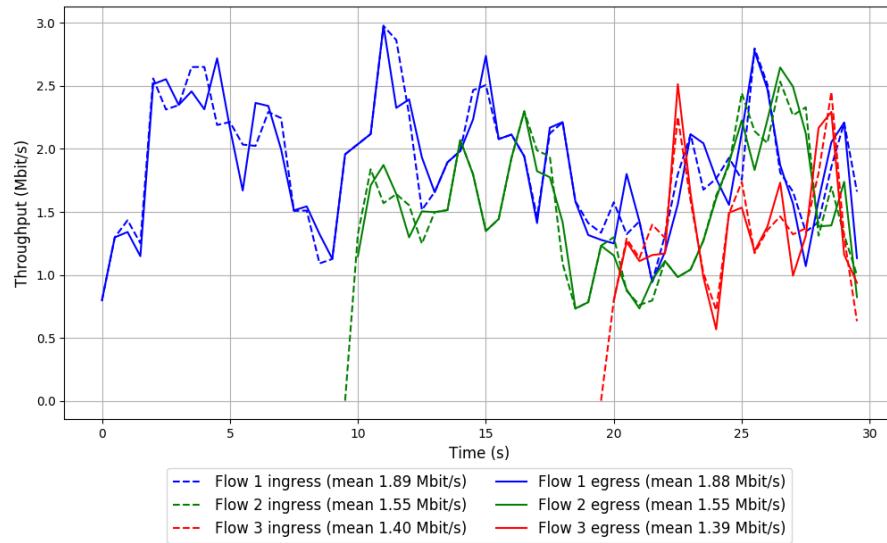


Run 2: Statistics of Sprout

```
Start at: 2017-08-13 07:00:43
End at: 2017-08-13 07:01:13
Local clock offset: -0.331 ms
Remote clock offset: -18.412 ms

# Below is generated by plot.py at 2017-08-13 07:36:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.37 Mbit/s
95th percentile per-packet one-way delay: 62.597 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 63.089 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 57.618 ms
Loss rate: 0.32%
-- Flow 3:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 67.347 ms
Loss rate: 0.69%
```

Run 2: Report of Sprout — Data Link

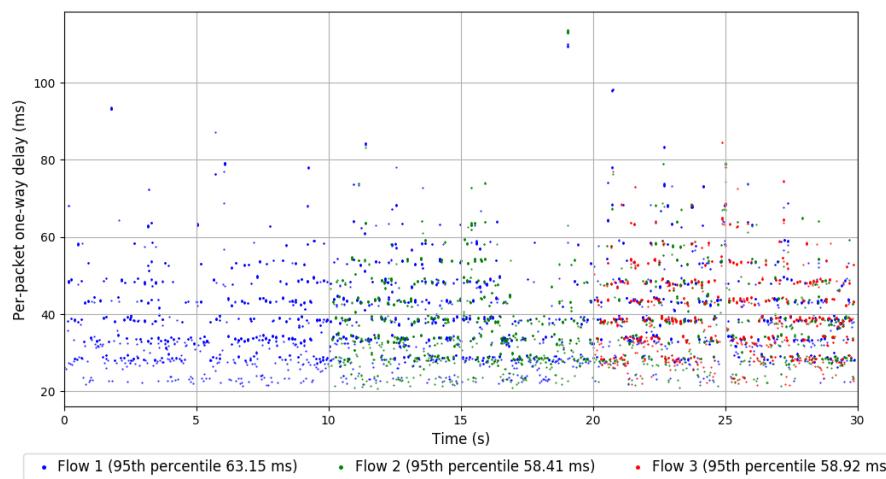
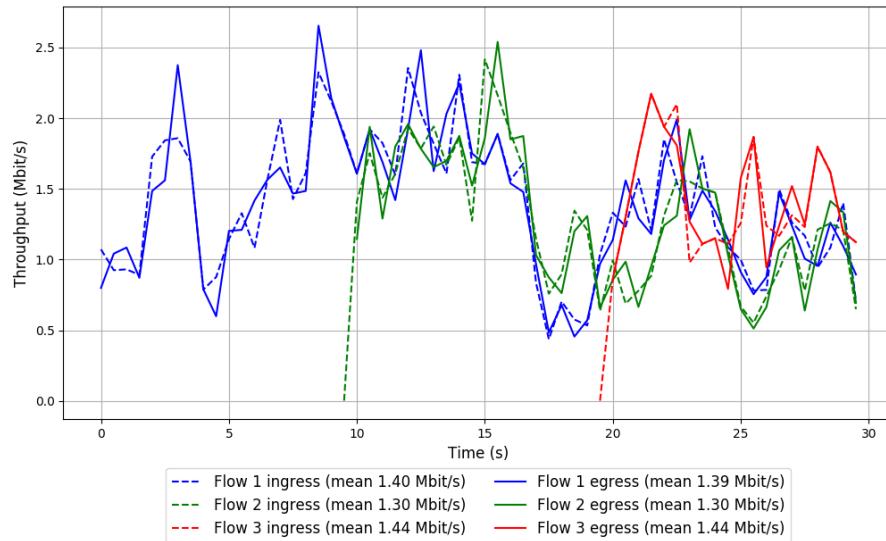


Run 3: Statistics of Sprout

```
Start at: 2017-08-13 07:18:42
End at: 2017-08-13 07:19:12
Local clock offset: -1.275 ms
Remote clock offset: -18.163 ms

# Below is generated by plot.py at 2017-08-13 07:36:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.73 Mbit/s
95th percentile per-packet one-way delay: 60.956 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 63.153 ms
Loss rate: 0.67%
-- Flow 2:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 58.408 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 58.920 ms
Loss rate: 0.00%
```

Run 3: Report of Sprout — Data Link

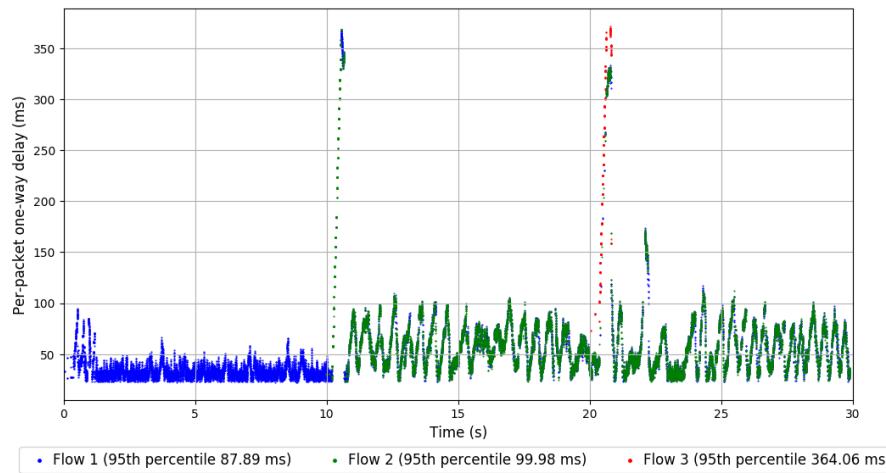
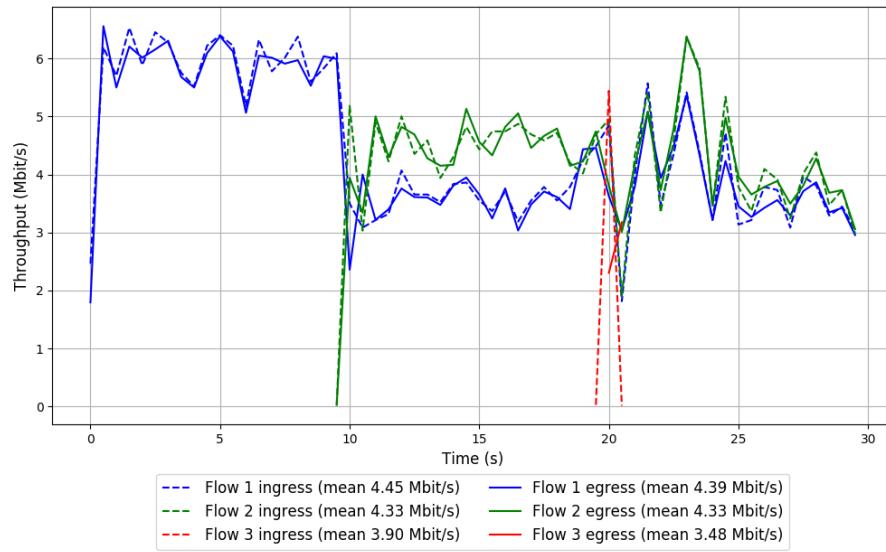


Run 1: Statistics of TaoVA-100x

```
Start at: 2017-08-13 06:55:56
End at: 2017-08-13 06:56:26
Local clock offset: -2.283 ms
Remote clock offset: -19.228 ms

# Below is generated by plot.py at 2017-08-13 07:36:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.37 Mbit/s
95th percentile per-packet one-way delay: 97.360 ms
Loss rate: 0.93%
-- Flow 1:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 87.886 ms
Loss rate: 1.42%
-- Flow 2:
Average throughput: 4.33 Mbit/s
95th percentile per-packet one-way delay: 99.985 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 3.48 Mbit/s
95th percentile per-packet one-way delay: 364.060 ms
Loss rate: 0.00%
```

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

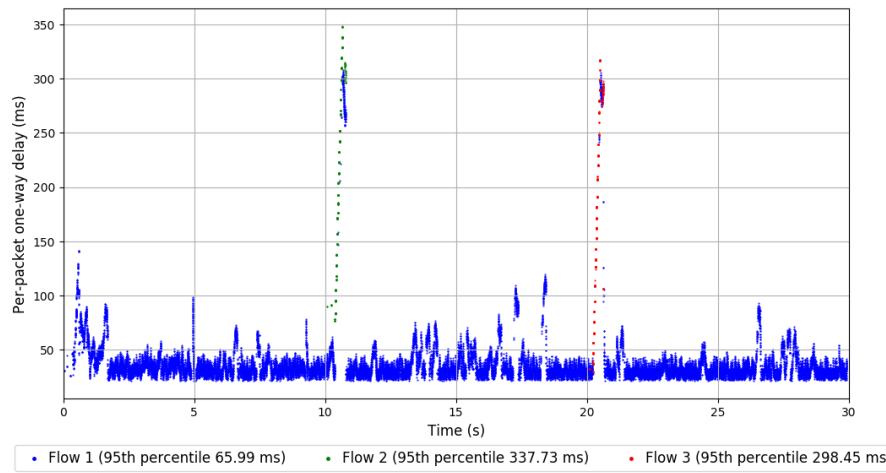
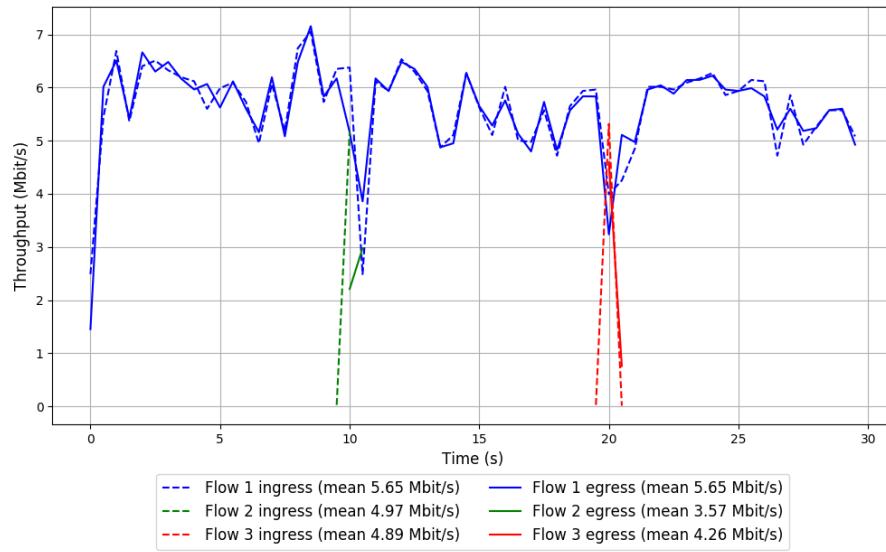


Run 2: Statistics of TaoVA-100x

```
Start at: 2017-08-13 07:12:55
End at: 2017-08-13 07:13:25
Local clock offset: 0.765 ms
Remote clock offset: -15.796 ms

# Below is generated by plot.py at 2017-08-13 07:36:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.82 Mbit/s
95th percentile per-packet one-way delay: 86.399 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 5.65 Mbit/s
95th percentile per-packet one-way delay: 65.986 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 337.727 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 4.26 Mbit/s
95th percentile per-packet one-way delay: 298.455 ms
Loss rate: 0.04%
```

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

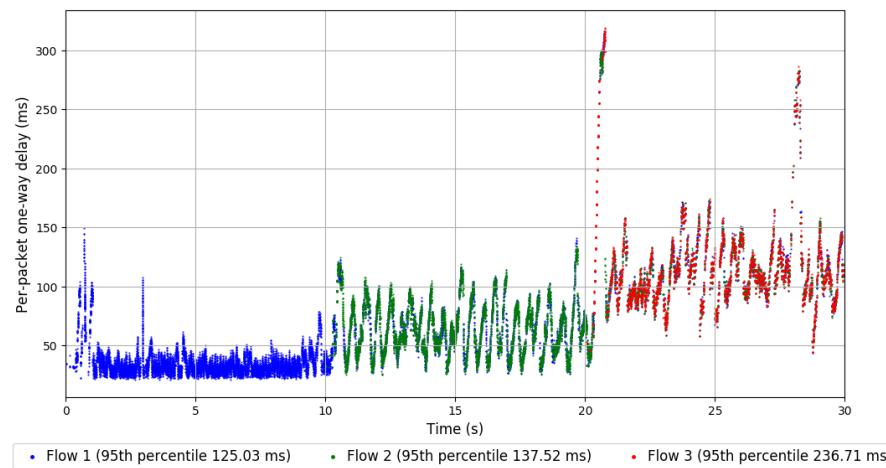
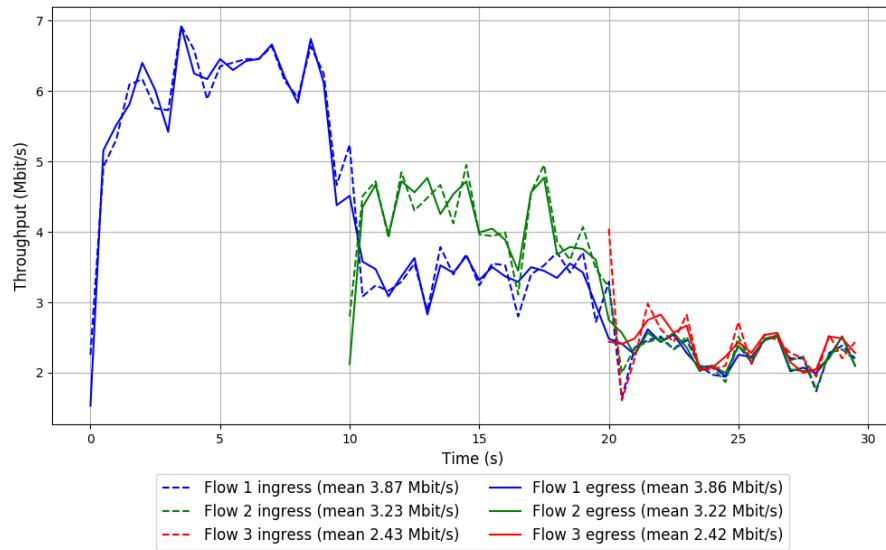


Run 3: Statistics of TaoVA-100x

```
Start at: 2017-08-13 07:32:36
End at: 2017-08-13 07:33:07
Local clock offset: 0.769 ms
Remote clock offset: -16.458 ms

# Below is generated by plot.py at 2017-08-13 07:36:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.81 Mbit/s
95th percentile per-packet one-way delay: 138.752 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 3.86 Mbit/s
95th percentile per-packet one-way delay: 125.033 ms
Loss rate: 0.41%
-- Flow 2:
Average throughput: 3.22 Mbit/s
95th percentile per-packet one-way delay: 137.520 ms
Loss rate: 0.38%
-- Flow 3:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 236.711 ms
Loss rate: 1.18%
```

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

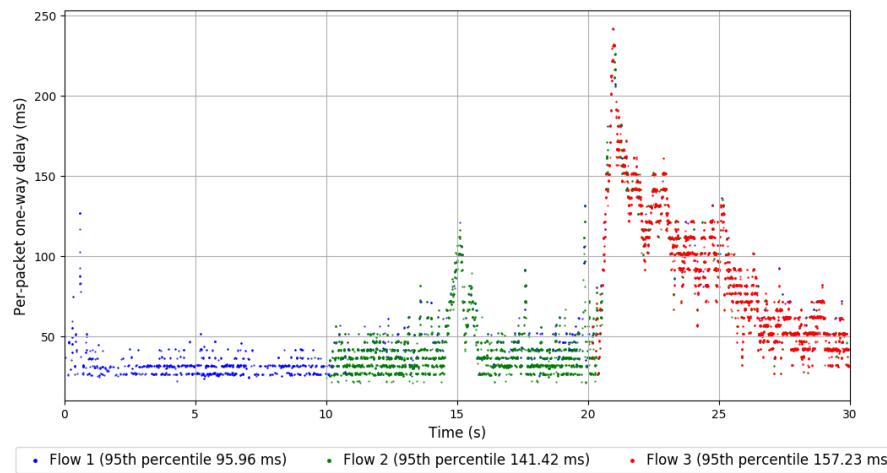
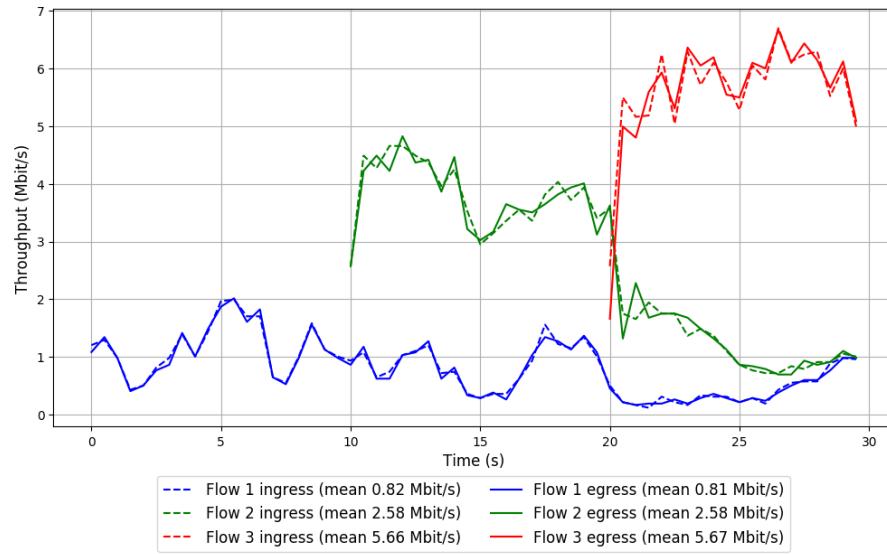


Run 1: Statistics of TCP Vegas

```
Start at: 2017-08-13 06:41:15
End at: 2017-08-13 06:41:45
Local clock offset: 0.938 ms
Remote clock offset: -18.631 ms

# Below is generated by plot.py at 2017-08-13 07:36:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.40 Mbit/s
95th percentile per-packet one-way delay: 150.889 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 95.962 ms
Loss rate: 1.37%
-- Flow 2:
Average throughput: 2.58 Mbit/s
95th percentile per-packet one-way delay: 141.423 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 5.67 Mbit/s
95th percentile per-packet one-way delay: 157.229 ms
Loss rate: 0.28%
```

Run 1: Report of TCP Vegas — Data Link

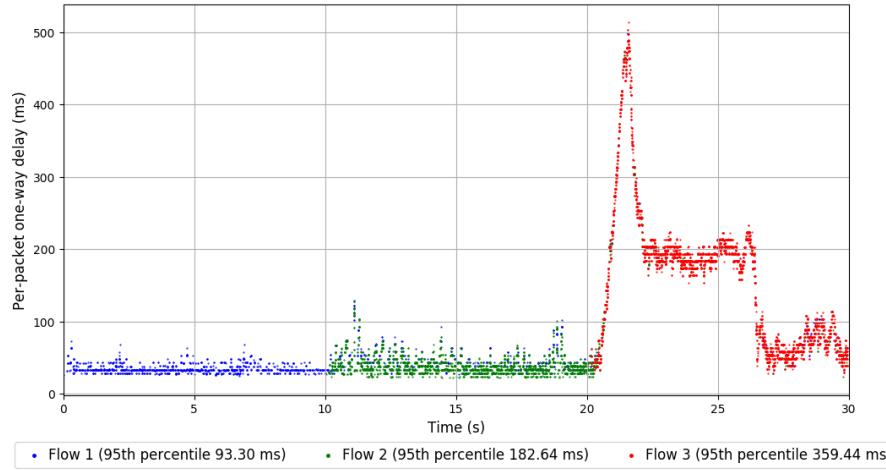
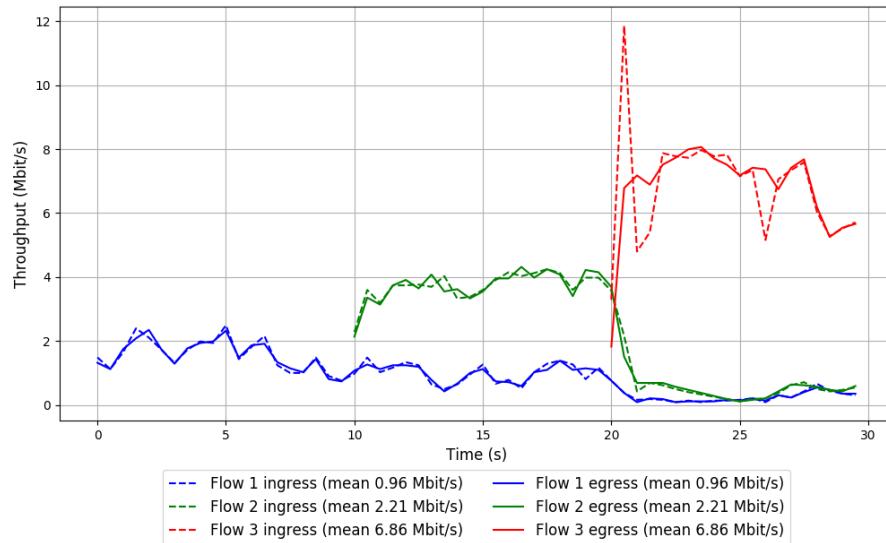


Run 2: Statistics of TCP Vegas

```
Start at: 2017-08-13 06:59:37
End at: 2017-08-13 07:00:07
Local clock offset: -1.727 ms
Remote clock offset: -19.039 ms

# Below is generated by plot.py at 2017-08-13 07:36:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.69 Mbit/s
95th percentile per-packet one-way delay: 253.763 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 93.300 ms
Loss rate: 0.92%
-- Flow 2:
Average throughput: 2.21 Mbit/s
95th percentile per-packet one-way delay: 182.641 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 6.86 Mbit/s
95th percentile per-packet one-way delay: 359.444 ms
Loss rate: 0.62%
```

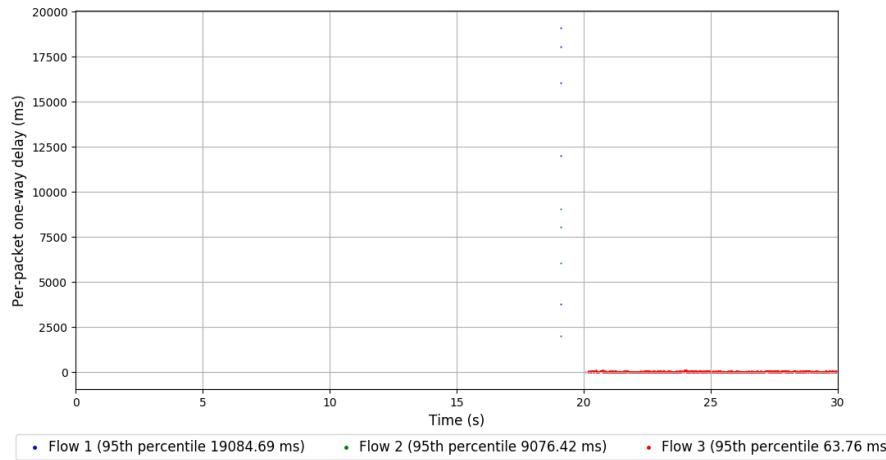
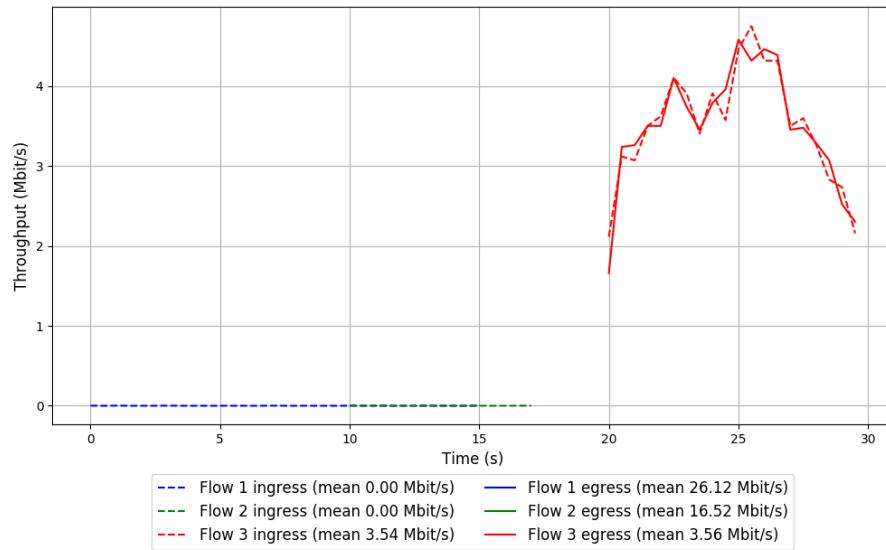
Run 2: Report of TCP Vegas — Data Link



Run 3: Statistics of TCP Vegas

Start at: 2017-08-13 07:17:16
End at: 2017-08-13 07:17:46
Local clock offset: 0.002 ms
Remote clock offset: -17.078 ms

Run 3: Report of TCP Vegas — Data Link

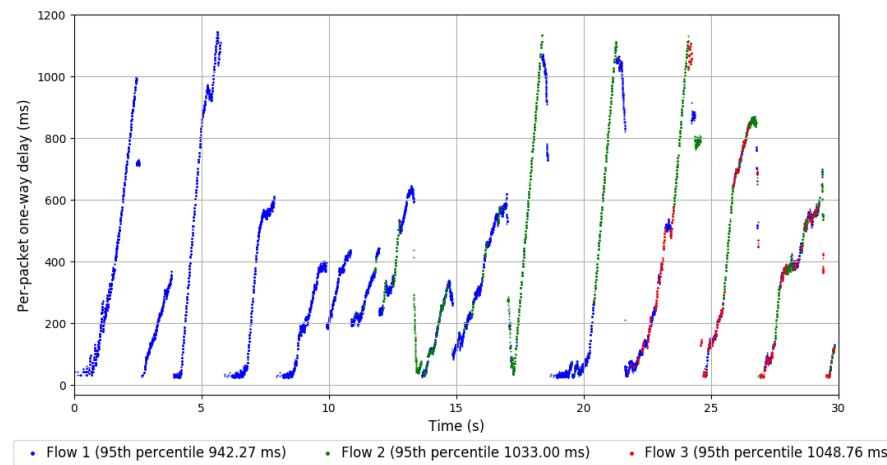
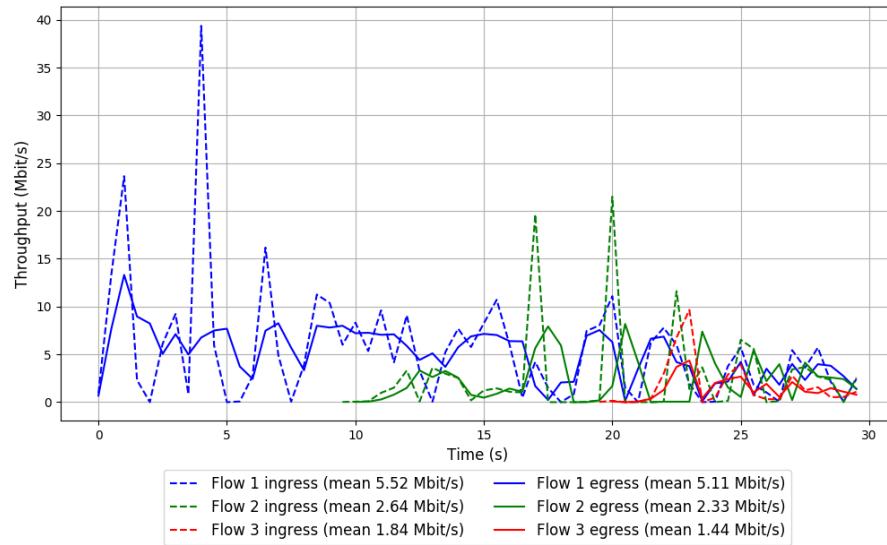


Run 1: Statistics of Verus

```
Start at: 2017-08-13 06:57:24
End at: 2017-08-13 06:57:54
Local clock offset: 1.415 ms
Remote clock offset: -17.112 ms

# Below is generated by plot.py at 2017-08-13 07:36:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.12 Mbit/s
95th percentile per-packet one-way delay: 970.773 ms
Loss rate: 9.92%
-- Flow 1:
Average throughput: 5.11 Mbit/s
95th percentile per-packet one-way delay: 942.271 ms
Loss rate: 7.59%
-- Flow 2:
Average throughput: 2.33 Mbit/s
95th percentile per-packet one-way delay: 1032.996 ms
Loss rate: 13.02%
-- Flow 3:
Average throughput: 1.44 Mbit/s
95th percentile per-packet one-way delay: 1048.761 ms
Loss rate: 22.10%
```

Run 1: Report of Verus — Data Link

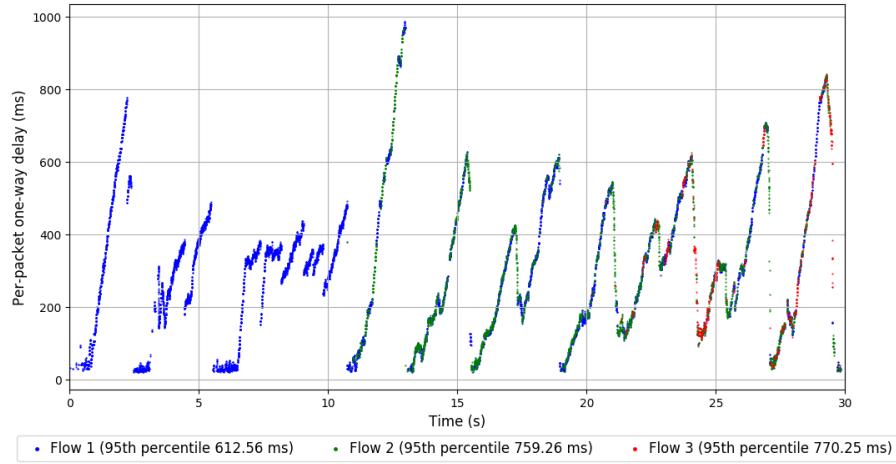
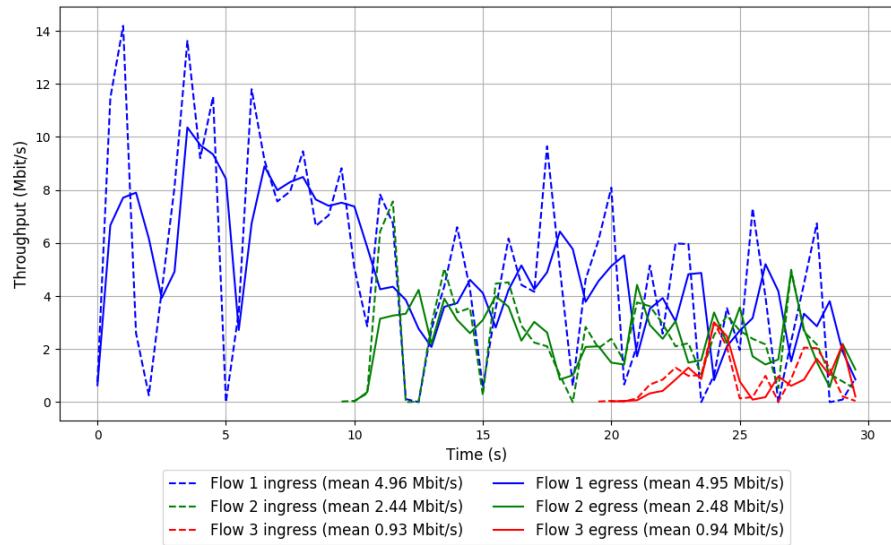


Run 2: Statistics of Verus

```
Start at: 2017-08-13 07:14:43
End at: 2017-08-13 07:15:13
Local clock offset: 0.334 ms
Remote clock offset: -17.571 ms

# Below is generated by plot.py at 2017-08-13 07:36:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.87 Mbit/s
95th percentile per-packet one-way delay: 666.231 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 4.95 Mbit/s
95th percentile per-packet one-way delay: 612.564 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 2.48 Mbit/s
95th percentile per-packet one-way delay: 759.262 ms
Loss rate: 0.32%
-- Flow 3:
Average throughput: 0.94 Mbit/s
95th percentile per-packet one-way delay: 770.252 ms
Loss rate: 0.26%
```

Run 2: Report of Verus — Data Link

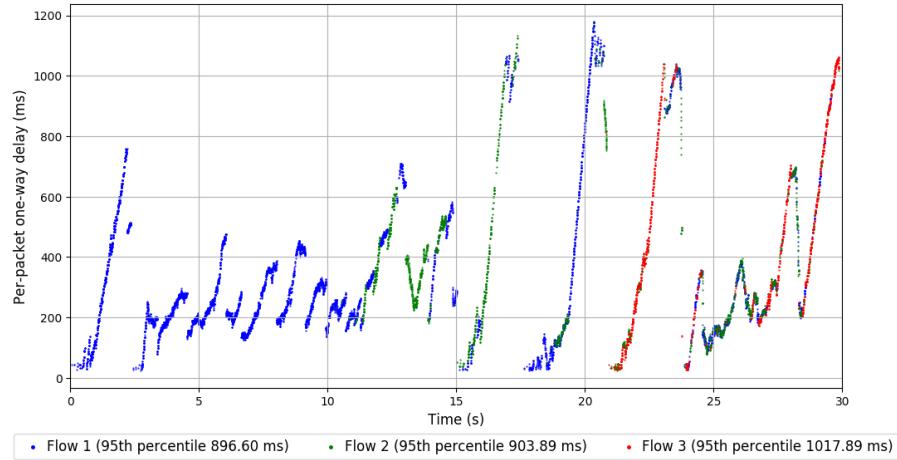
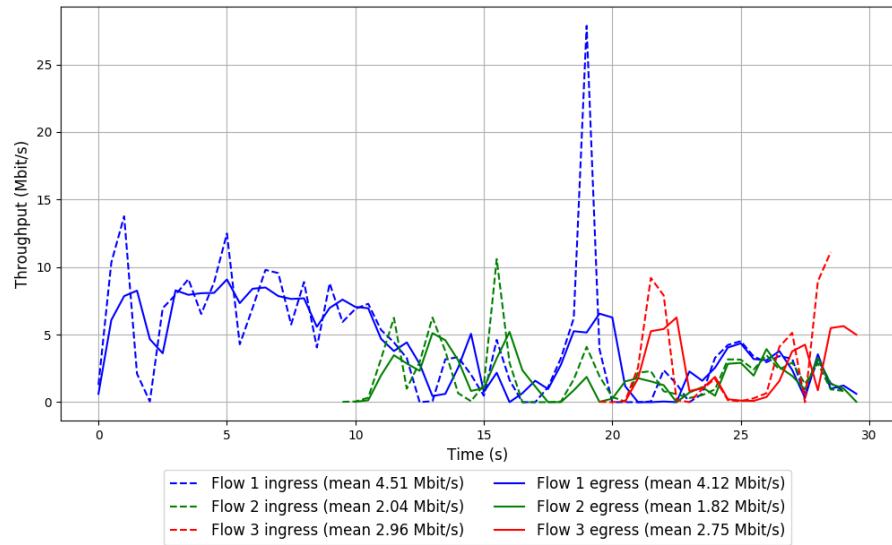


Run 3: Statistics of Verus

```
Start at: 2017-08-13 07:33:43
End at: 2017-08-13 07:34:13
Local clock offset: -0.839 ms
Remote clock offset: -18.225 ms

# Below is generated by plot.py at 2017-08-13 07:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.16 Mbit/s
95th percentile per-packet one-way delay: 954.883 ms
Loss rate: 7.13%
-- Flow 1:
Average throughput: 4.12 Mbit/s
95th percentile per-packet one-way delay: 896.598 ms
Loss rate: 6.77%
-- Flow 2:
Average throughput: 1.82 Mbit/s
95th percentile per-packet one-way delay: 903.889 ms
Loss rate: 8.98%
-- Flow 3:
Average throughput: 2.75 Mbit/s
95th percentile per-packet one-way delay: 1017.890 ms
Loss rate: 6.15%
```

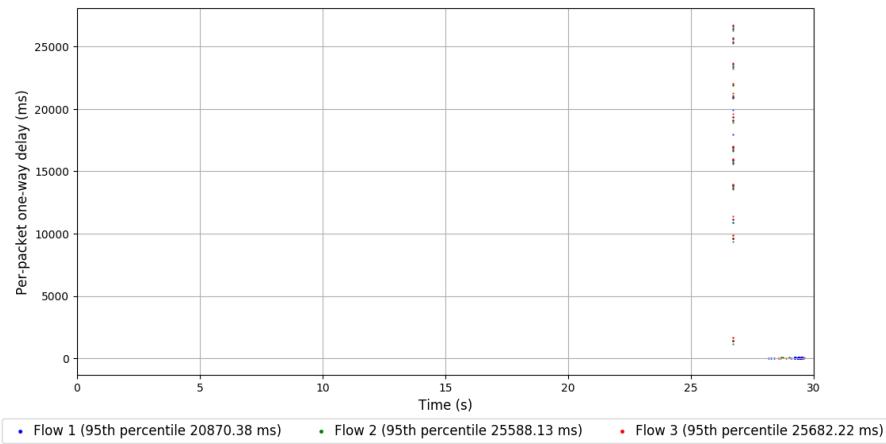
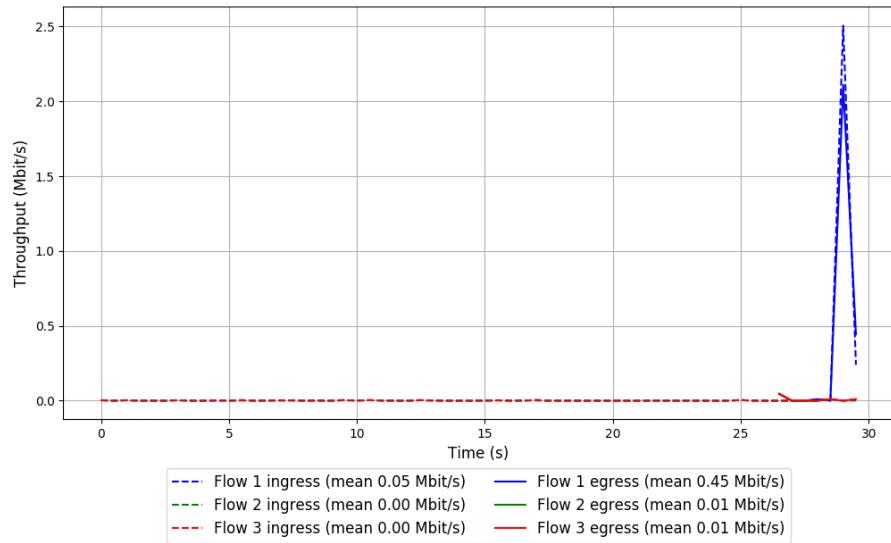
Run 3: Report of Verus — Data Link



Run 1: Statistics of WebRTC media

Start at: 2017-08-13 06:54:50
End at: 2017-08-13 06:55:20
Local clock offset: -0.752 ms
Remote clock offset: -18.511 ms

Run 1: Report of WebRTC media — Data Link

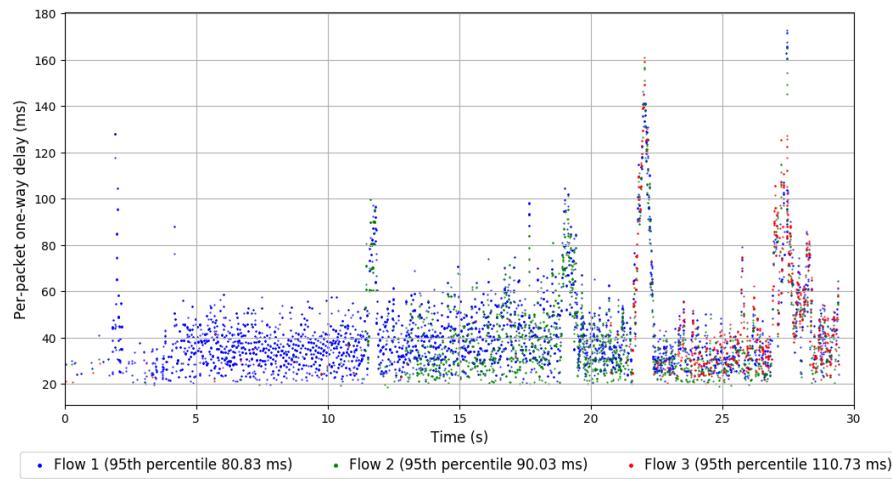
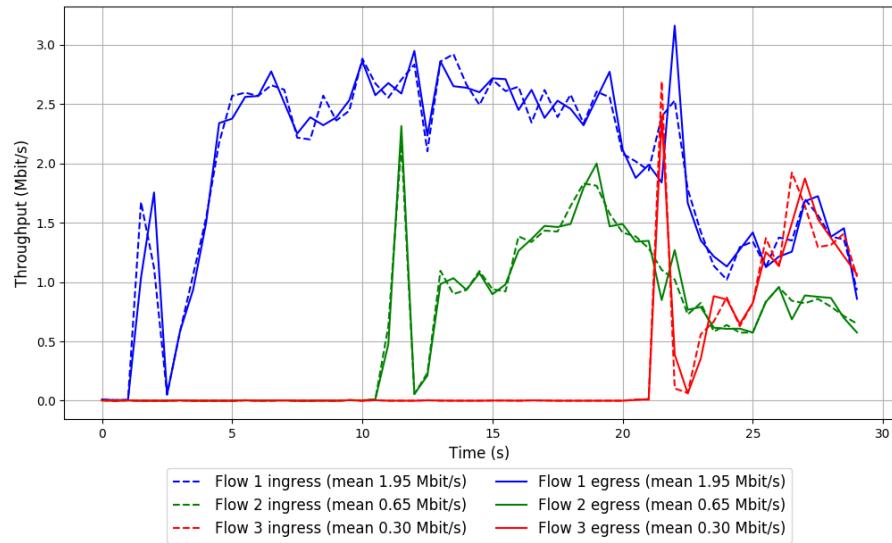


Run 2: Statistics of WebRTC media

```
Start at: 2017-08-13 07:11:49
End at: 2017-08-13 07:12:19
Local clock offset: 1.248 ms
Remote clock offset: -17.376 ms

# Below is generated by plot.py at 2017-08-13 07:36:24
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 89.621 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 1.95 Mbit/s
95th percentile per-packet one-way delay: 80.827 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 90.034 ms
Loss rate: 0.24%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 110.727 ms
Loss rate: 0.97%
```

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2017-08-13 07:31:31
End at: 2017-08-13 07:32:01
Local clock offset: 0.871 ms
Remote clock offset: -18.535 ms

Run 3: Report of WebRTC media — Data Link

