

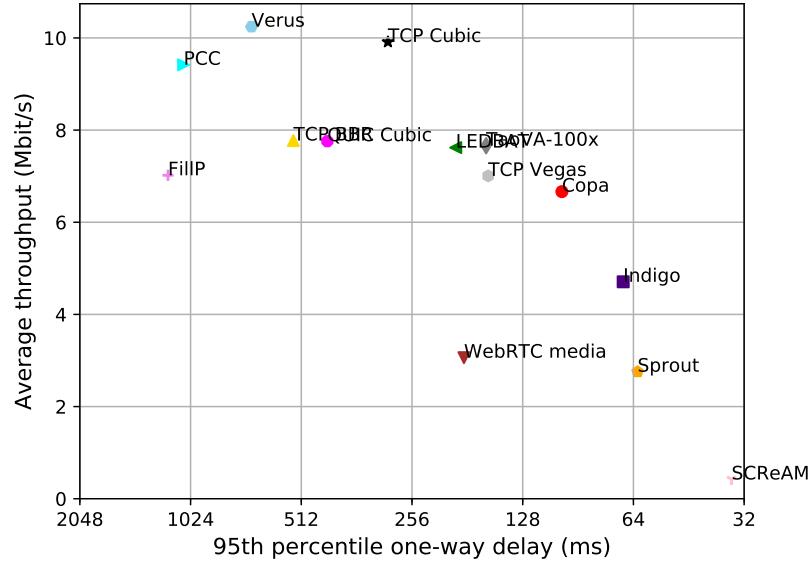
Pantheon Report

Generated at 2018-01-16 02:05:08 (UTC).
Data path: AWS India 1 Ethernet (*local*) → India ppp0 (*remote*).
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 nets.org.sg and have been applied to correct the timestamps in logs.

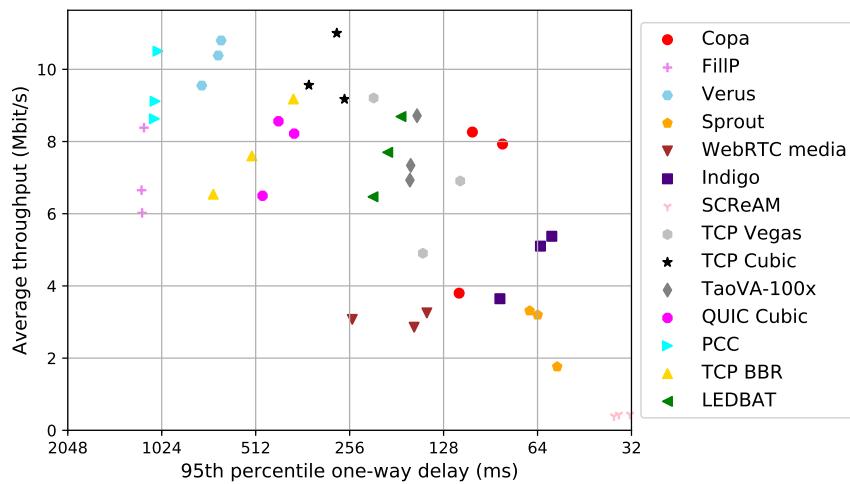
Git summary:

```
branch: master @ af8abdfba95588b0c5f2aeca9e856a1656b0c598
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 423cbca3e8ea1d599e7b5cf725835e8a2b6bfac6
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



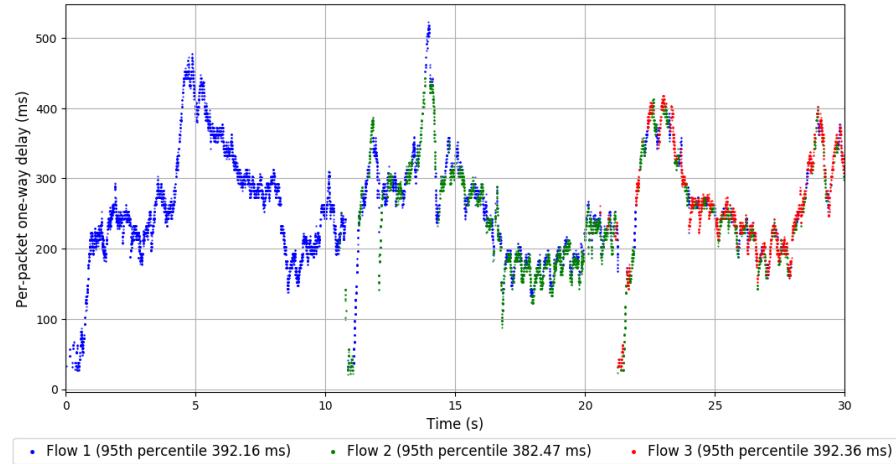
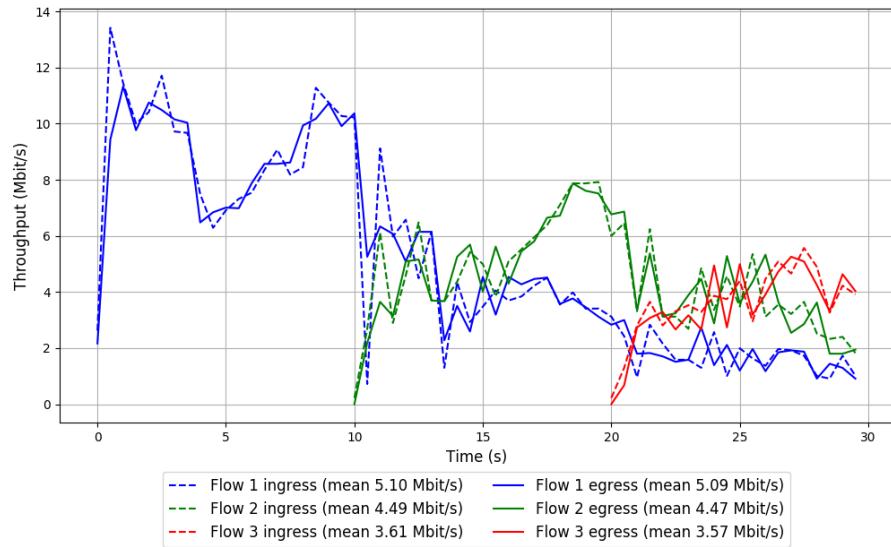
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	4.83	3.15	2.72	523.20	550.26	572.12	0.64	1.74	3.95
TCP Cubic		6.71	3.25	3.25	281.10	307.46	336.13	0.34	1.12	2.71
LEDBAT		4.98	3.16	1.63	191.16	201.49	226.62	0.18	0.46	2.08
PCC		6.91	2.78	2.26	1054.94	1100.56	1146.60	18.69	46.67	91.82
QUIC Cubic		5.03	3.45	1.45	415.94	484.47	476.89	0.79	1.72	4.16
SCReAM		0.20	0.22	0.22	37.68	37.03	33.35	0.12	0.07	0.12
WebRTC media		1.86	0.88	0.33	111.78	180.69	264.77	0.08	0.03	0.92
Sprout		1.41	1.37	1.33	60.02	63.01	69.36	0.24	0.16	0.47
TaoVA-100x		4.30	3.78	3.32	125.78	186.33	263.65	0.27	0.46	1.17
TCP Vegas		3.49	2.29	6.04	171.75	146.79	152.08	0.14	0.30	0.52
Verus		6.50	4.64	2.20	646.40	786.35	708.57	1.40	2.84	5.70
Copa		4.30	2.74	2.12	93.63	104.70	129.53	0.10	0.38	0.82
FillP		4.83	1.99	3.37	1145.02	1193.27	1204.27	89.65	97.44	97.94
Indigo		2.04	2.58	2.94	60.80	76.66	76.99	0.06	0.10	0.27

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-16 01:24:26
End at: 2018-01-16 01:24:56
Local clock offset: -16.967 ms
Remote clock offset: -16.899 ms

# Below is generated by plot.py at 2018-01-16 02:04:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.18 Mbit/s
95th percentile per-packet one-way delay: 387.558 ms
Loss rate: 1.12%
-- Flow 1:
Average throughput: 5.09 Mbit/s
95th percentile per-packet one-way delay: 392.164 ms
Loss rate: 0.53%
-- Flow 2:
Average throughput: 4.47 Mbit/s
95th percentile per-packet one-way delay: 382.469 ms
Loss rate: 1.12%
-- Flow 3:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 392.358 ms
Loss rate: 3.60%
```

Run 1: Report of TCP BBR — Data Link

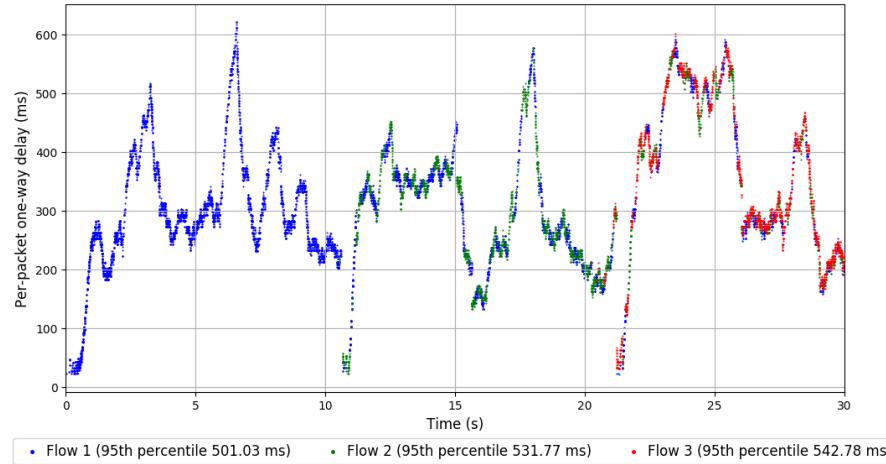
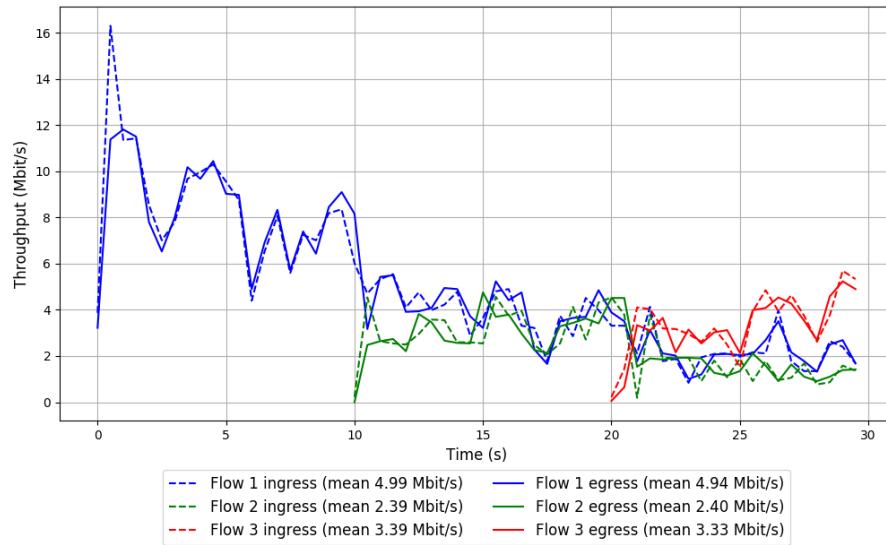


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-16 01:41:04
End at: 2018-01-16 01:41:34
Local clock offset: -17.003 ms
Remote clock offset: -17.979 ms

# Below is generated by plot.py at 2018-01-16 02:04:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.60 Mbit/s
95th percentile per-packet one-way delay: 526.484 ms
Loss rate: 1.23%
-- Flow 1:
Average throughput: 4.94 Mbit/s
95th percentile per-packet one-way delay: 501.030 ms
Loss rate: 0.65%
-- Flow 2:
Average throughput: 2.40 Mbit/s
95th percentile per-packet one-way delay: 531.772 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 3.33 Mbit/s
95th percentile per-packet one-way delay: 542.782 ms
Loss rate: 4.02%
```

Run 2: Report of TCP BBR — Data Link

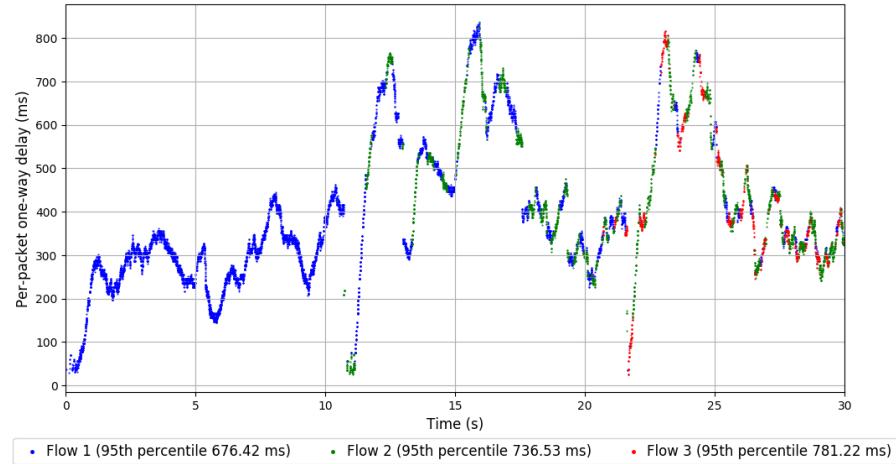
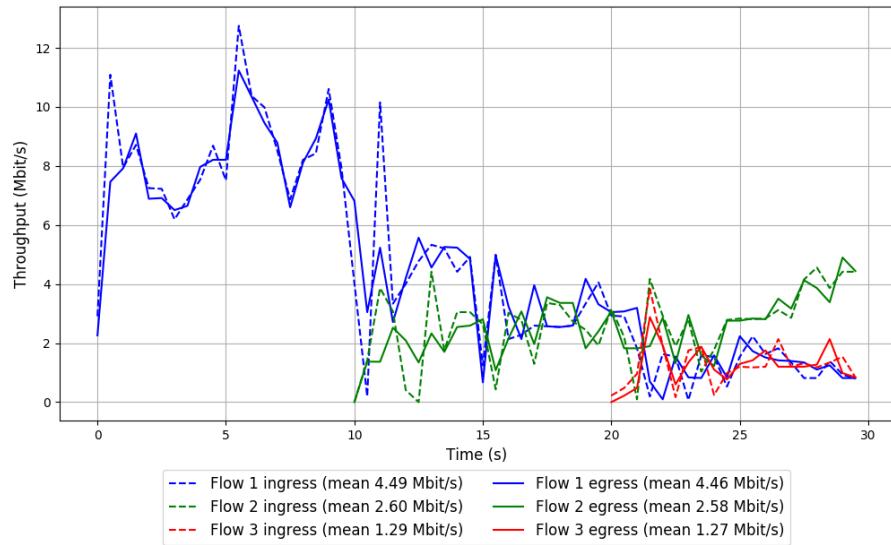


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-16 01:57:41
End at: 2018-01-16 01:58:11
Local clock offset: -20.784 ms
Remote clock offset: -15.799 ms

# Below is generated by plot.py at 2018-01-16 02:04:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.54 Mbit/s
95th percentile per-packet one-way delay: 700.112 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 4.46 Mbit/s
95th percentile per-packet one-way delay: 676.416 ms
Loss rate: 0.74%
-- Flow 2:
Average throughput: 2.58 Mbit/s
95th percentile per-packet one-way delay: 736.527 ms
Loss rate: 3.03%
-- Flow 3:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 781.215 ms
Loss rate: 4.22%
```

Run 3: Report of TCP BBR — Data Link

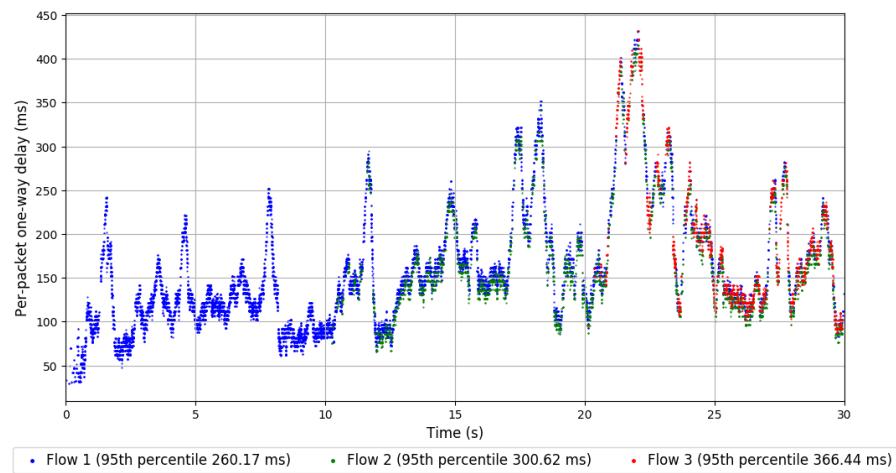
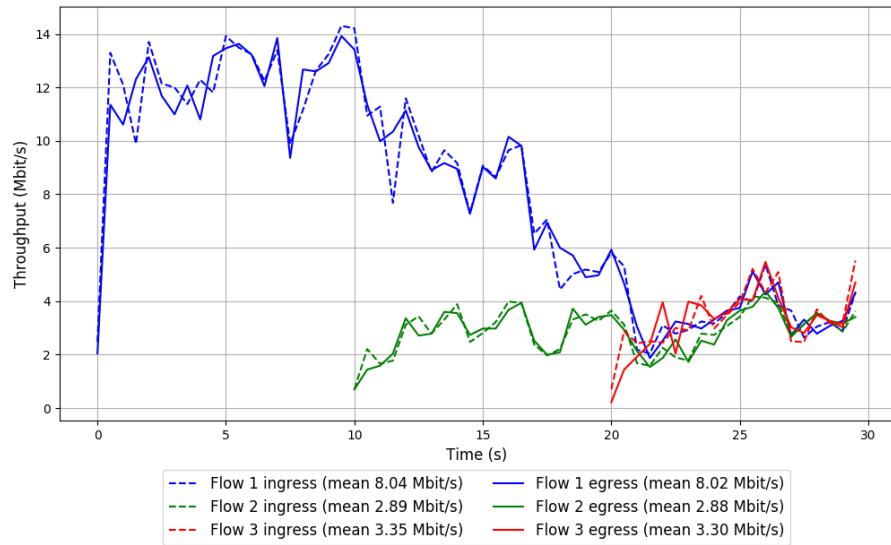


Run 1: Statistics of TCP Cubic

```
Start at: 2018-01-16 01:16:39
End at: 2018-01-16 01:17:09
Local clock offset: -17.523 ms
Remote clock offset: -16.864 ms

# Below is generated by plot.py at 2018-01-16 02:04:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.00 Mbit/s
95th percentile per-packet one-way delay: 281.469 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 8.02 Mbit/s
95th percentile per-packet one-way delay: 260.167 ms
Loss rate: 0.28%
-- Flow 2:
Average throughput: 2.88 Mbit/s
95th percentile per-packet one-way delay: 300.617 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 3.30 Mbit/s
95th percentile per-packet one-way delay: 366.437 ms
Loss rate: 2.81%
```

Run 1: Report of TCP Cubic — Data Link

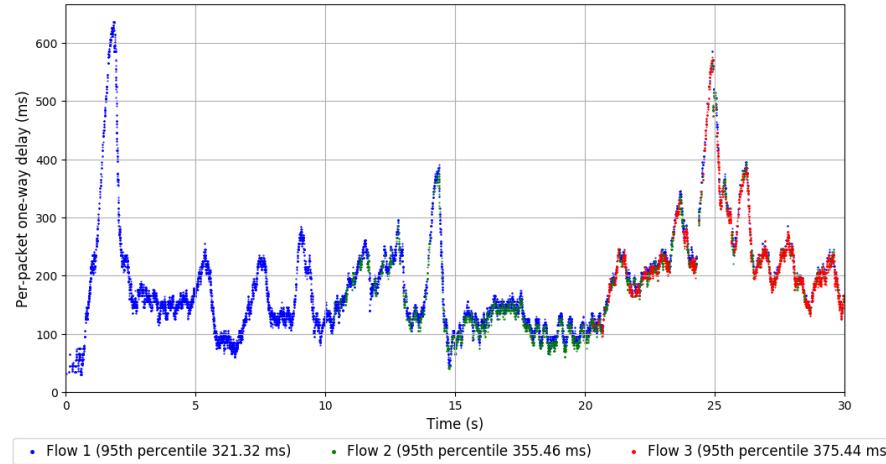
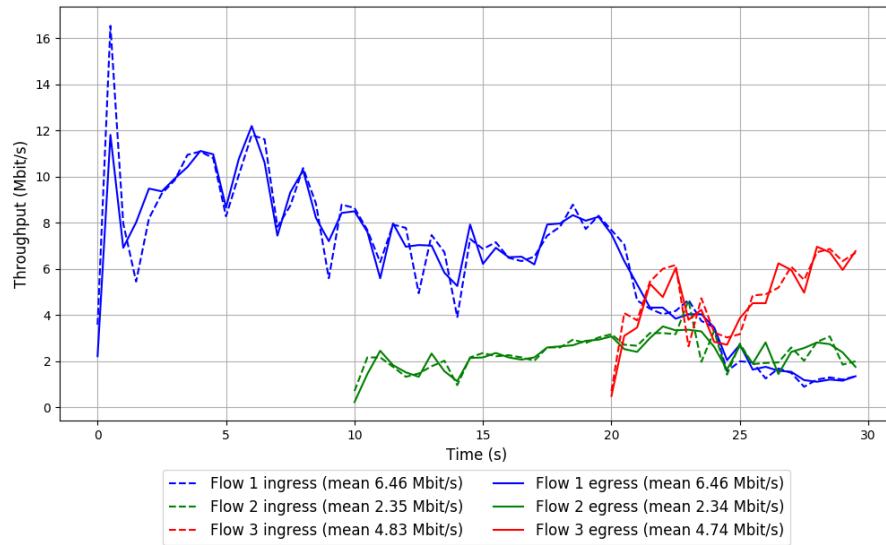


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-16 01:33:17
End at: 2018-01-16 01:33:47
Local clock offset: -15.064 ms
Remote clock offset: -15.815 ms

# Below is generated by plot.py at 2018-01-16 02:04:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.56 Mbit/s
95th percentile per-packet one-way delay: 345.783 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 6.46 Mbit/s
95th percentile per-packet one-way delay: 321.323 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 355.464 ms
Loss rate: 1.05%
-- Flow 3:
Average throughput: 4.74 Mbit/s
95th percentile per-packet one-way delay: 375.445 ms
Loss rate: 3.05%
```

Run 2: Report of TCP Cubic — Data Link

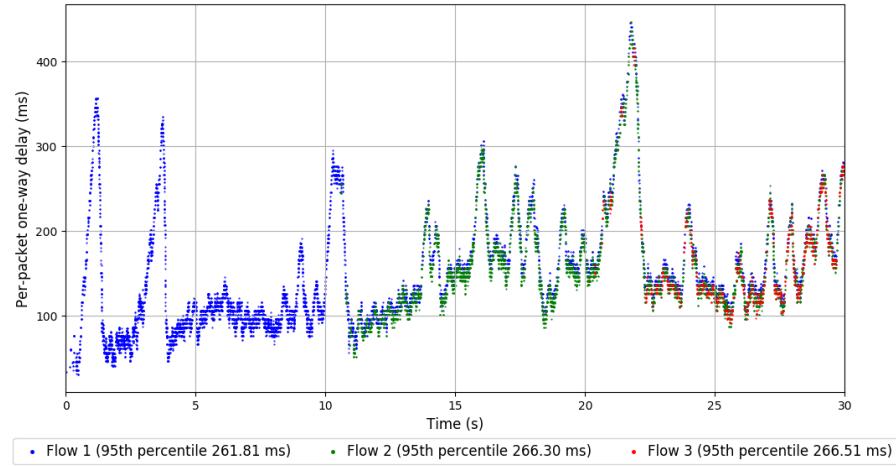
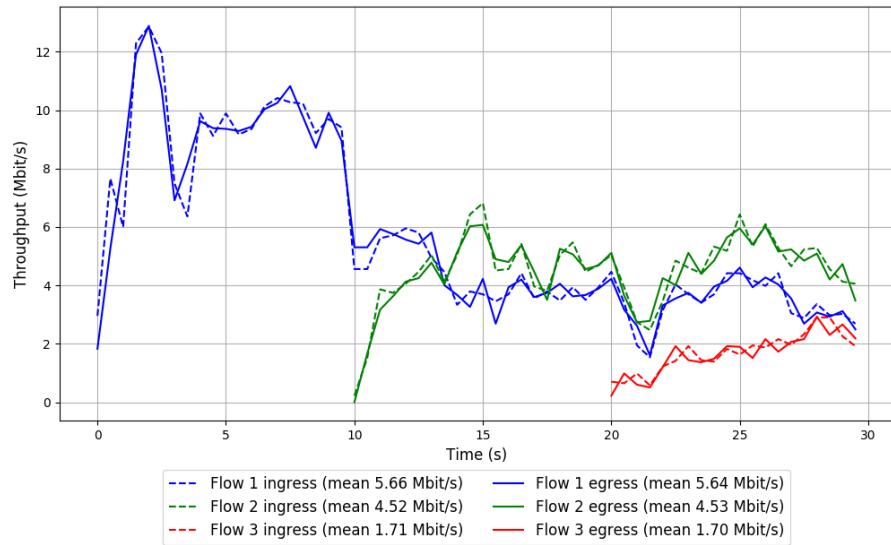


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-16 01:49:56
End at: 2018-01-16 01:50:26
Local clock offset: -16.713 ms
Remote clock offset: -15.904 ms

# Below is generated by plot.py at 2018-01-16 02:04:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.17 Mbit/s
95th percentile per-packet one-way delay: 265.834 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 5.64 Mbit/s
95th percentile per-packet one-way delay: 261.813 ms
Loss rate: 0.50%
-- Flow 2:
Average throughput: 4.53 Mbit/s
95th percentile per-packet one-way delay: 266.298 ms
Loss rate: 1.24%
-- Flow 3:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 266.506 ms
Loss rate: 2.26%
```

Run 3: Report of TCP Cubic — Data Link

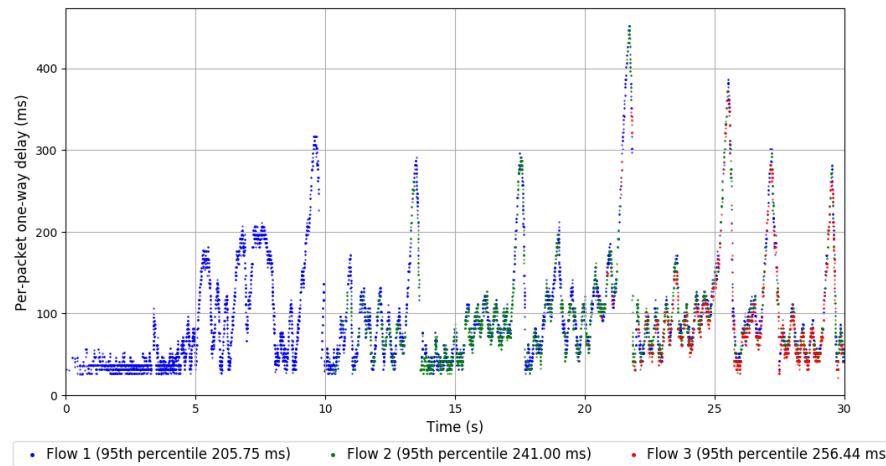
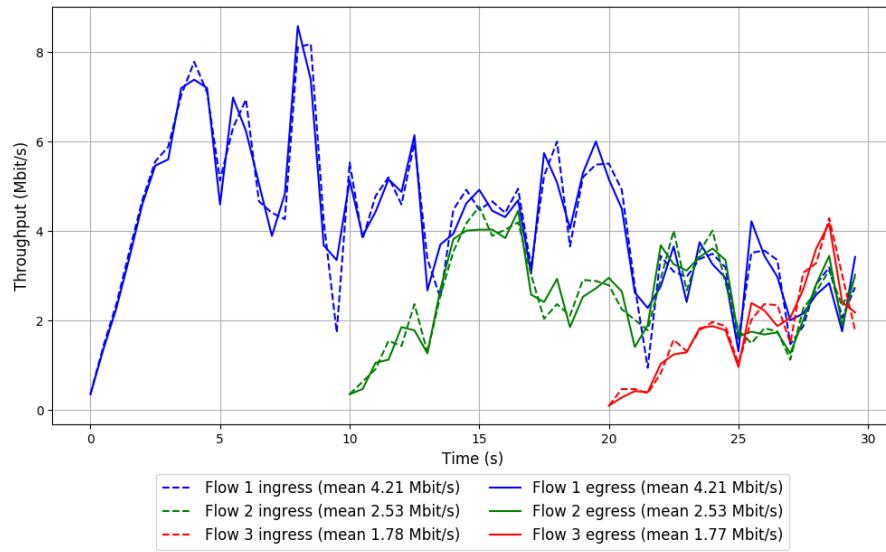


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-01-16 01:23:19
End at: 2018-01-16 01:23:49
Local clock offset: -17.974 ms
Remote clock offset: -18.467 ms

# Below is generated by plot.py at 2018-01-16 02:04:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.47 Mbit/s
95th percentile per-packet one-way delay: 215.464 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 4.21 Mbit/s
95th percentile per-packet one-way delay: 205.746 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 240.997 ms
Loss rate: 0.51%
-- Flow 3:
Average throughput: 1.77 Mbit/s
95th percentile per-packet one-way delay: 256.441 ms
Loss rate: 1.72%
```

Run 1: Report of LEDBAT — Data Link

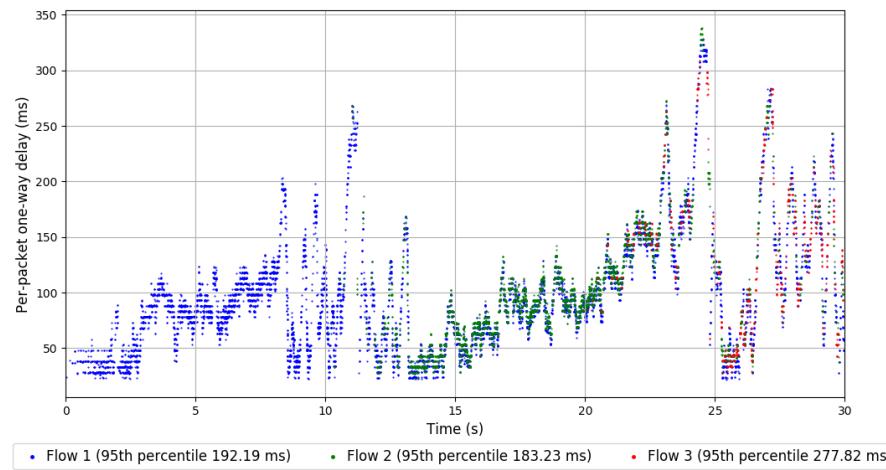
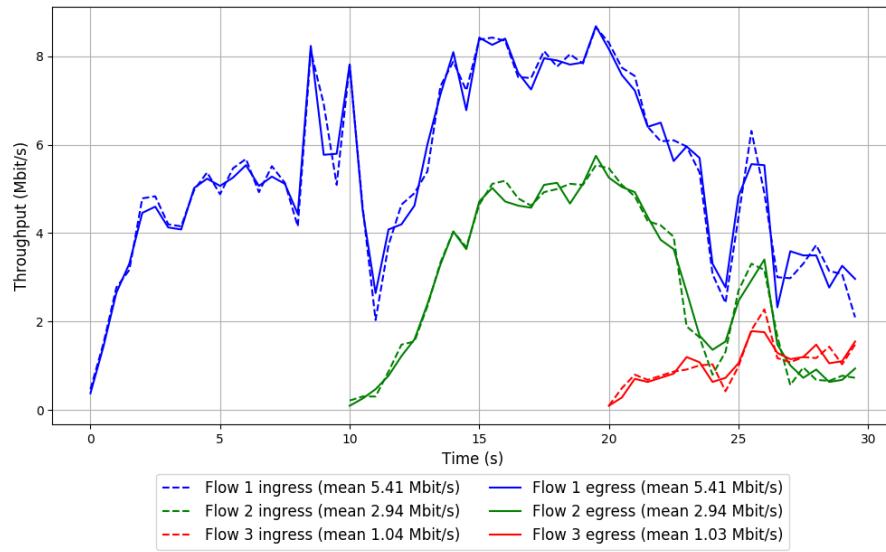


Run 2: Statistics of LEDBAT

```
Start at: 2018-01-16 01:39:58
End at: 2018-01-16 01:40:28
Local clock offset: -16.097 ms
Remote clock offset: -16.508 ms

# Below is generated by plot.py at 2018-01-16 02:04:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.70 Mbit/s
95th percentile per-packet one-way delay: 193.318 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 5.41 Mbit/s
95th percentile per-packet one-way delay: 192.193 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 2.94 Mbit/s
95th percentile per-packet one-way delay: 183.228 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 277.823 ms
Loss rate: 1.93%
```

Run 2: Report of LEDBAT — Data Link

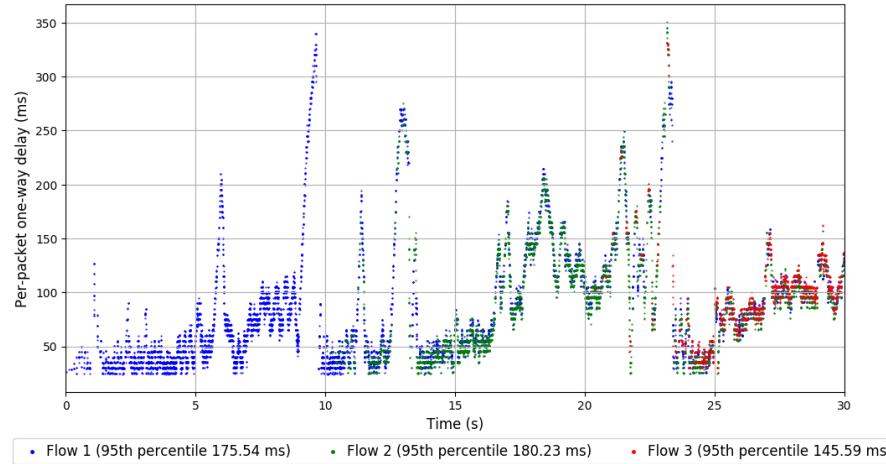
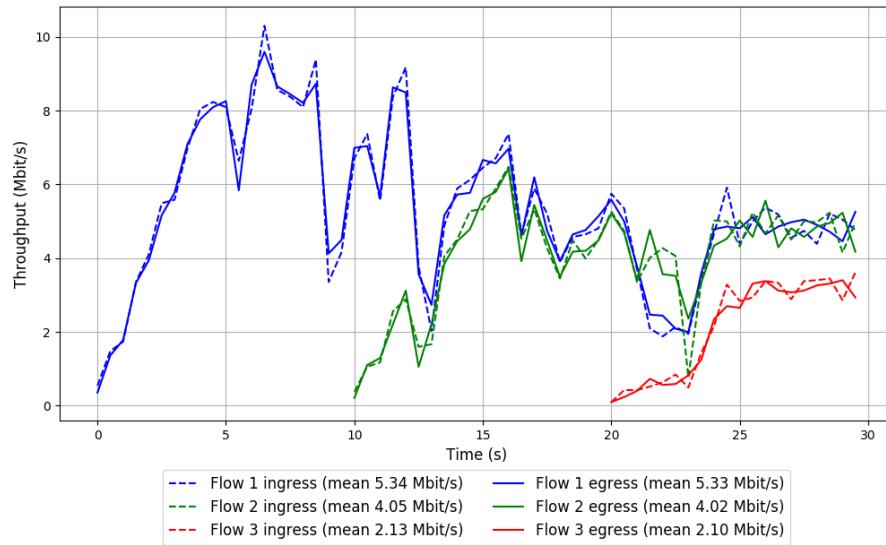


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-16 01:56:35
End at: 2018-01-16 01:57:05
Local clock offset: -18.46 ms
Remote clock offset: -14.448 ms

# Below is generated by plot.py at 2018-01-16 02:04:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.69 Mbit/s
95th percentile per-packet one-way delay: 175.267 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 5.33 Mbit/s
95th percentile per-packet one-way delay: 175.544 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 4.02 Mbit/s
95th percentile per-packet one-way delay: 180.233 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 145.587 ms
Loss rate: 2.60%
```

Run 3: Report of LEDBAT — Data Link

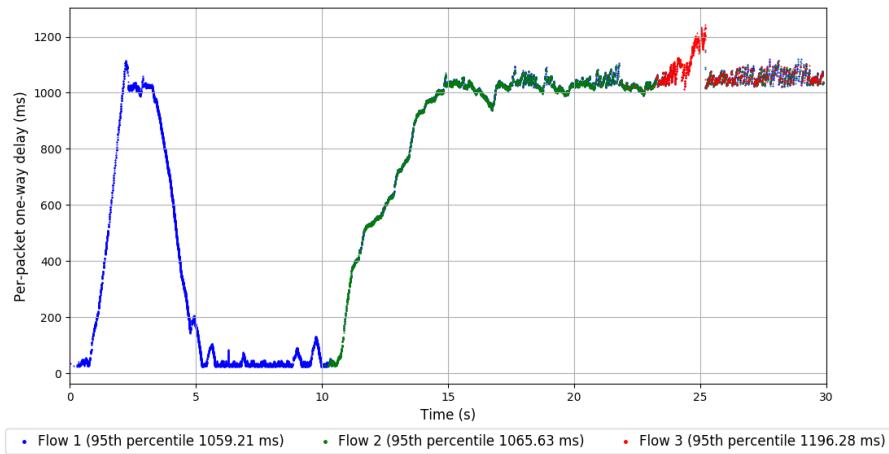
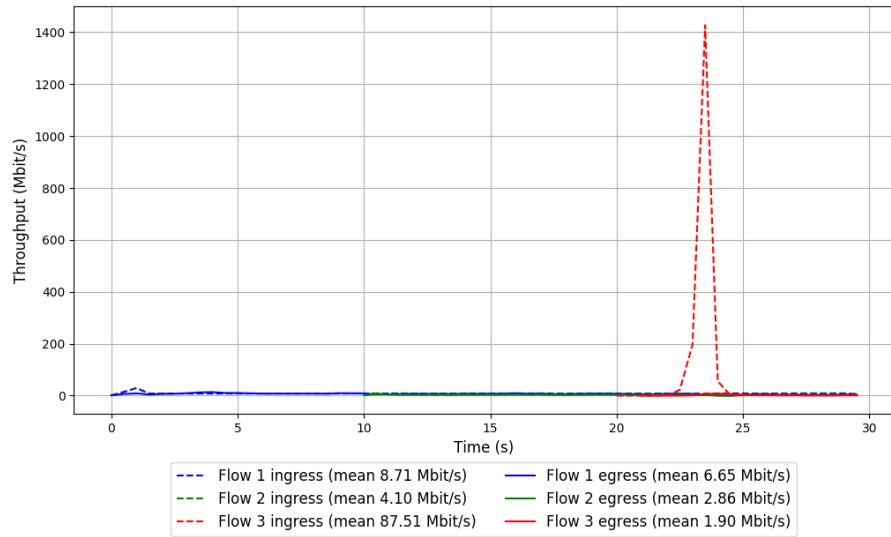


Run 1: Statistics of PCC

```
Start at: 2018-01-16 01:21:06
End at: 2018-01-16 01:21:36
Local clock offset: -18.326 ms
Remote clock offset: -16.063 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.11 Mbit/s
95th percentile per-packet one-way delay: 1075.656 ms
Loss rate: 77.42%
-- Flow 1:
Average throughput: 6.65 Mbit/s
95th percentile per-packet one-way delay: 1059.211 ms
Loss rate: 23.73%
-- Flow 2:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 1065.626 ms
Loss rate: 30.37%
-- Flow 3:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 1196.275 ms
Loss rate: 98.06%
```

Run 1: Report of PCC — Data Link

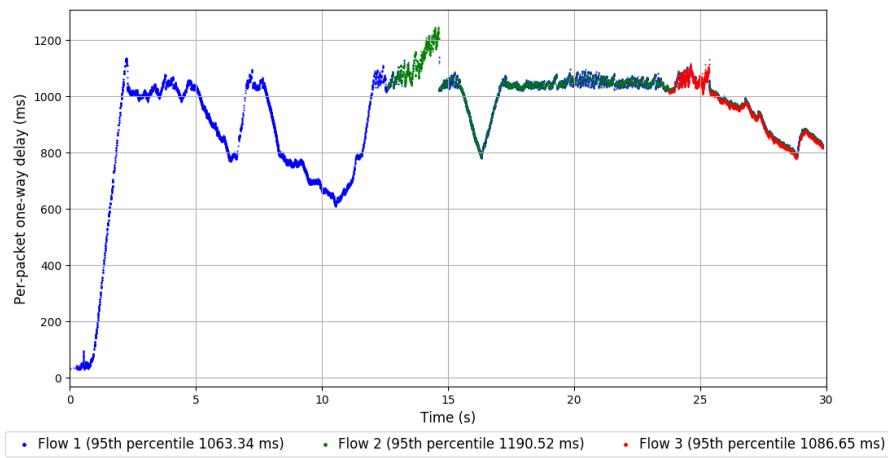
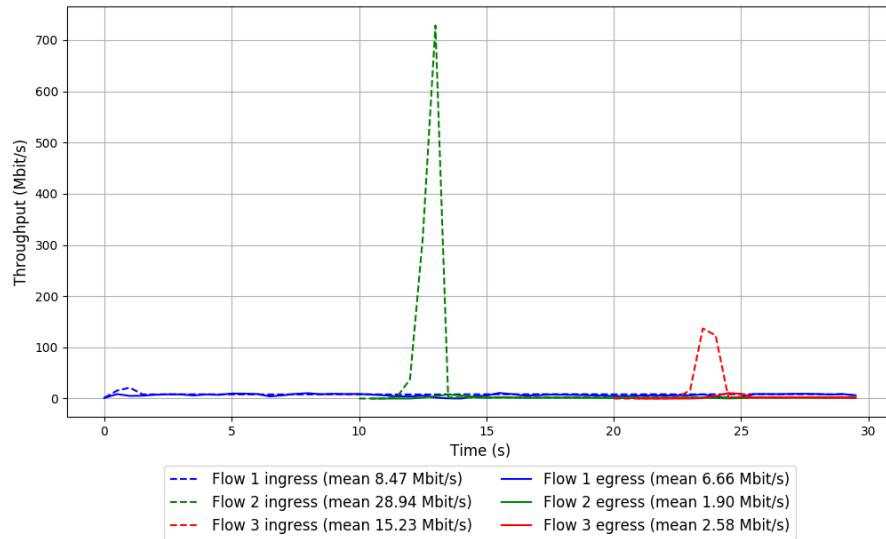


Run 2: Statistics of PCC

```
Start at: 2018-01-16 01:37:45
End at: 2018-01-16 01:38:15
Local clock offset: -18.047 ms
Remote clock offset: -17.746 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.63 Mbit/s
95th percentile per-packet one-way delay: 1080.858 ms
Loss rate: 73.67%
-- Flow 1:
Average throughput: 6.66 Mbit/s
95th percentile per-packet one-way delay: 1063.339 ms
Loss rate: 21.45%
-- Flow 2:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 1190.517 ms
Loss rate: 93.63%
-- Flow 3:
Average throughput: 2.58 Mbit/s
95th percentile per-packet one-way delay: 1086.647 ms
Loss rate: 85.28%
```

Run 2: Report of PCC — Data Link

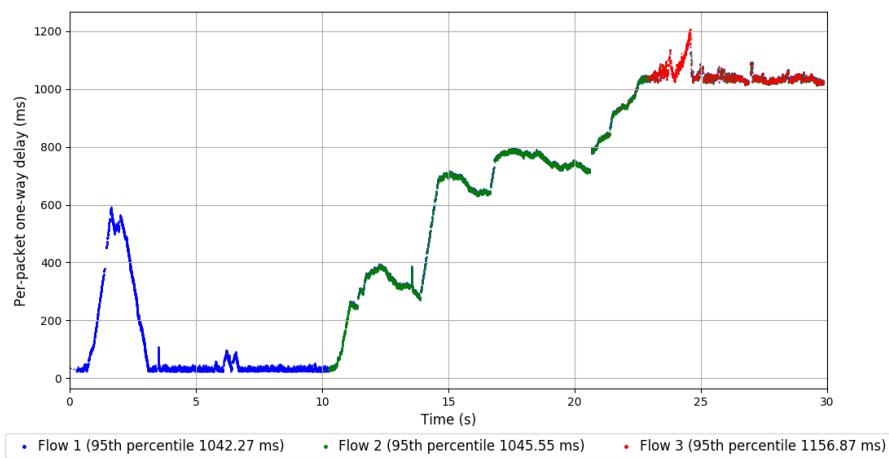
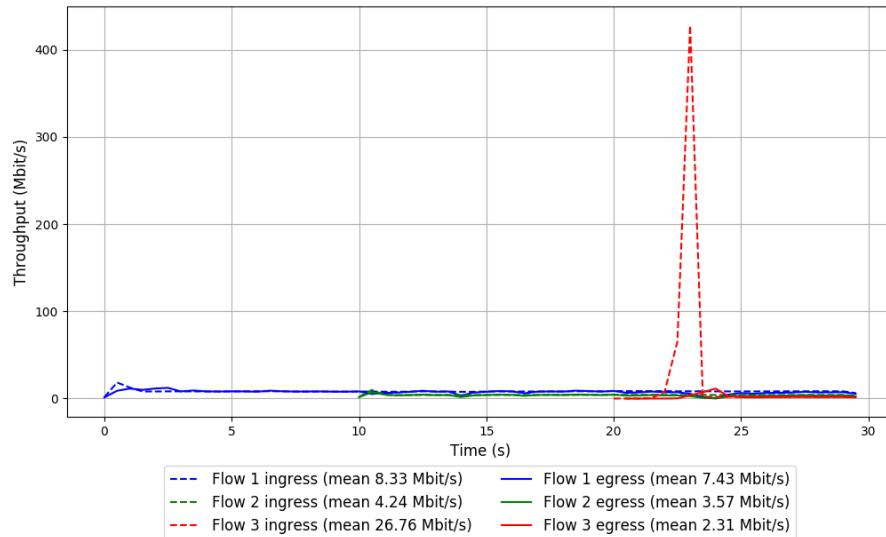


Run 3: Statistics of PCC

```
Start at: 2018-01-16 01:54:22
End at: 2018-01-16 01:54:52
Local clock offset: -18.624 ms
Remote clock offset: -16.113 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.50 Mbit/s
95th percentile per-packet one-way delay: 1052.483 ms
Loss rate: 47.50%
-- Flow 1:
Average throughput: 7.43 Mbit/s
95th percentile per-packet one-way delay: 1042.271 ms
Loss rate: 10.89%
-- Flow 2:
Average throughput: 3.57 Mbit/s
95th percentile per-packet one-way delay: 1045.547 ms
Loss rate: 16.01%
-- Flow 3:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 1156.872 ms
Loss rate: 92.11%
```

Run 3: Report of PCC — Data Link

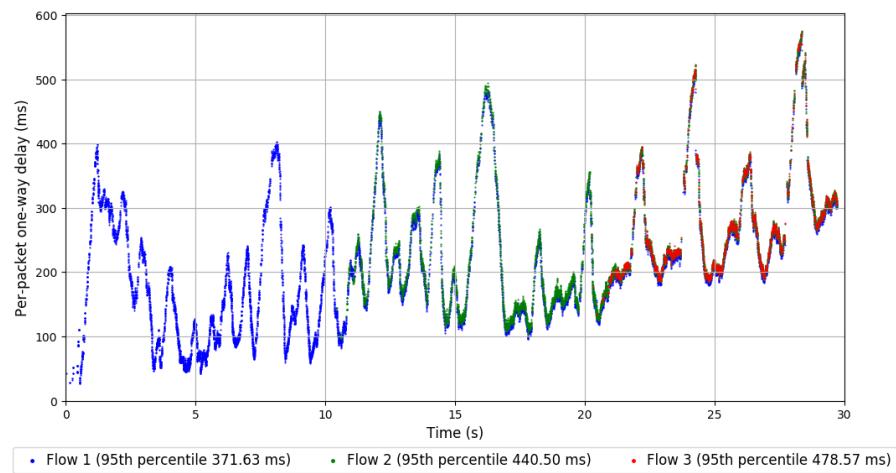
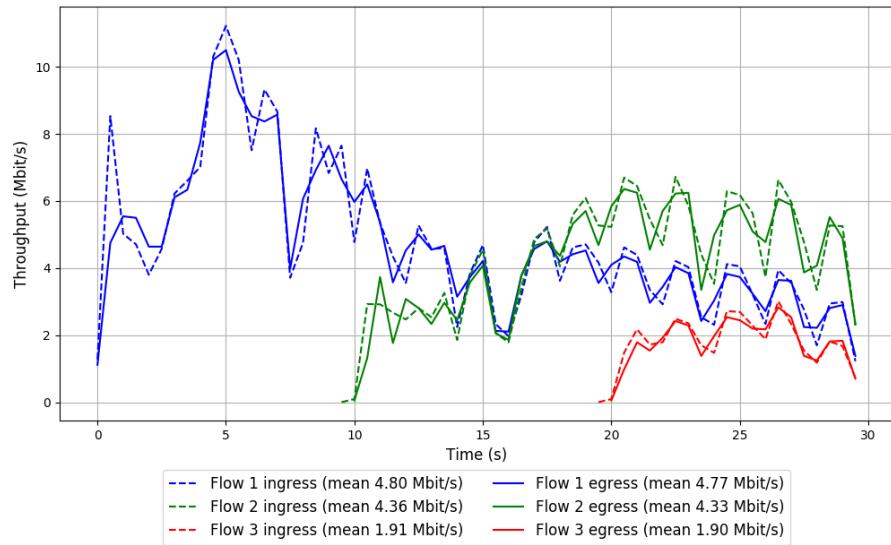


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2018-01-16 01:22:13
End at: 2018-01-16 01:22:43
Local clock offset: -19.176 ms
Remote clock offset: -16.141 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.22 Mbit/s
95th percentile per-packet one-way delay: 385.346 ms
Loss rate: 1.41%
-- Flow 1:
Average throughput: 4.77 Mbit/s
95th percentile per-packet one-way delay: 371.630 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 4.33 Mbit/s
95th percentile per-packet one-way delay: 440.502 ms
Loss rate: 2.10%
-- Flow 3:
Average throughput: 1.90 Mbit/s
95th percentile per-packet one-way delay: 478.569 ms
Loss rate: 2.93%
```

Run 1: Report of QUIC Cubic — Data Link

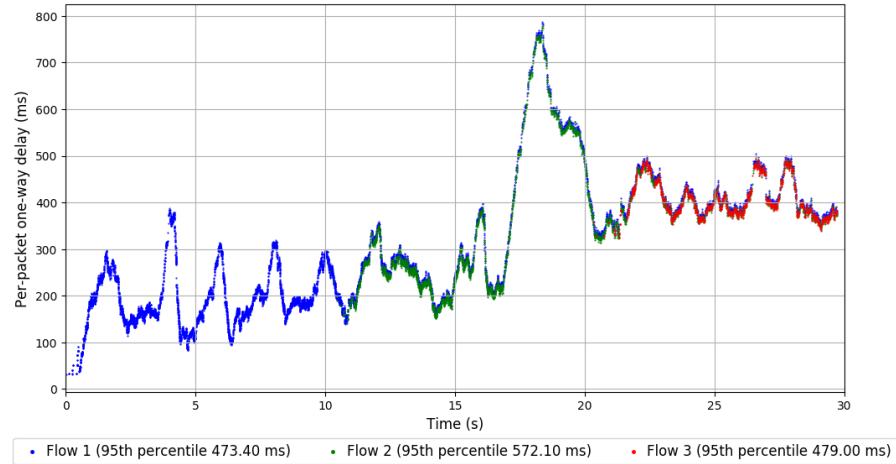
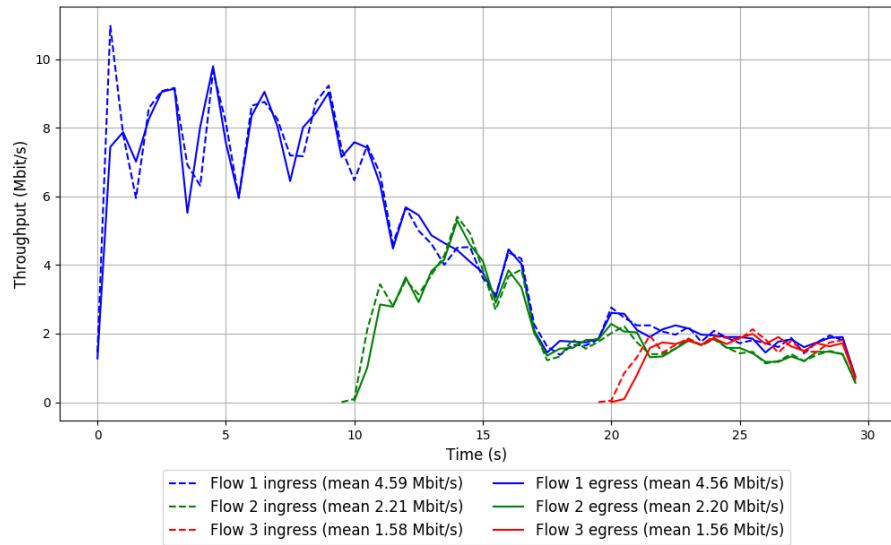


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-01-16 01:38:52
End at: 2018-01-16 01:39:22
Local clock offset: -18.311 ms
Remote clock offset: -17.476 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.50 Mbit/s
95th percentile per-packet one-way delay: 486.664 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 4.56 Mbit/s
95th percentile per-packet one-way delay: 473.403 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 572.095 ms
Loss rate: 1.74%
-- Flow 3:
Average throughput: 1.56 Mbit/s
95th percentile per-packet one-way delay: 478.997 ms
Loss rate: 5.13%
```

Run 2: Report of QUIC Cubic — Data Link

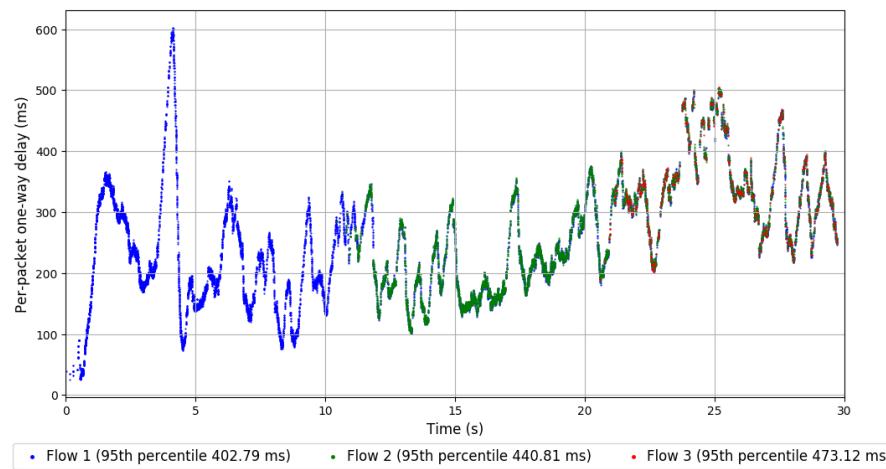
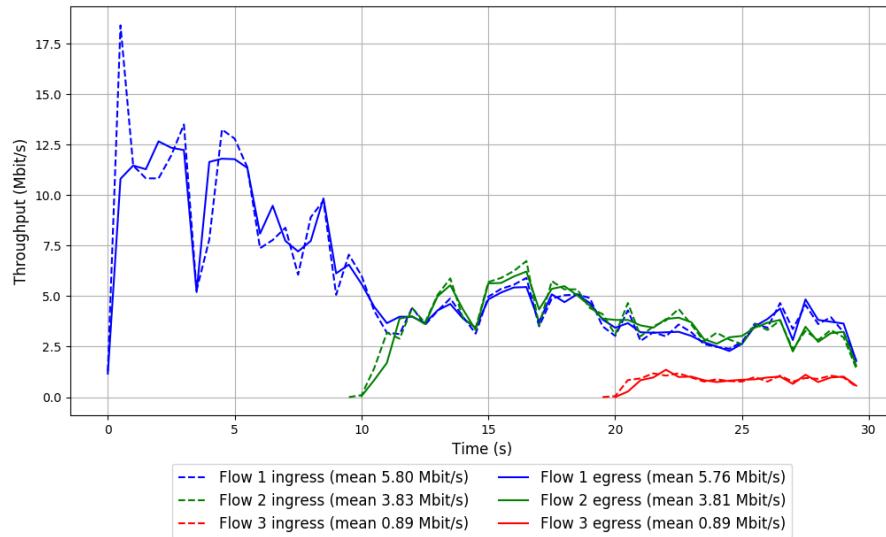


Run 3: Statistics of QUIC Cubic

```
Start at: 2018-01-16 01:55:29
End at: 2018-01-16 01:55:59
Local clock offset: -20.133 ms
Remote clock offset: -15.308 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.56 Mbit/s
95th percentile per-packet one-way delay: 432.750 ms
Loss rate: 1.07%
-- Flow 1:
Average throughput: 5.76 Mbit/s
95th percentile per-packet one-way delay: 402.793 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 3.81 Mbit/s
95th percentile per-packet one-way delay: 440.813 ms
Loss rate: 1.31%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 473.117 ms
Loss rate: 4.41%
```

Run 3: Report of QUIC Cubic — Data Link

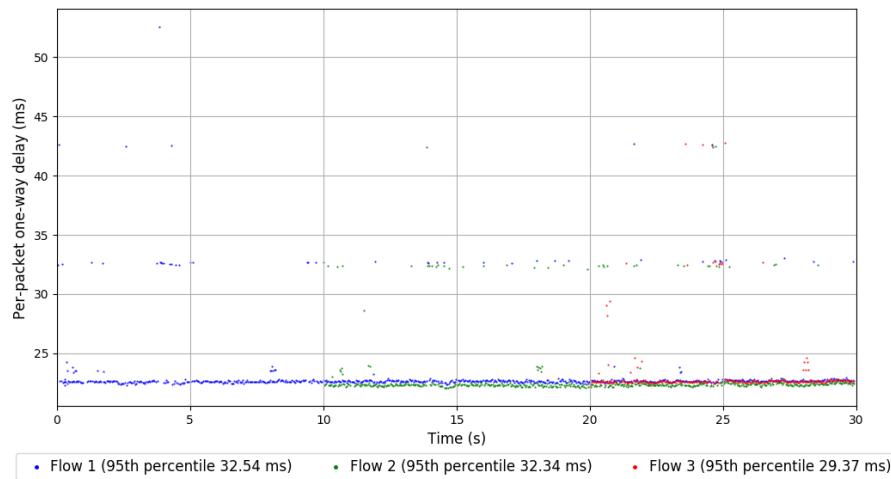
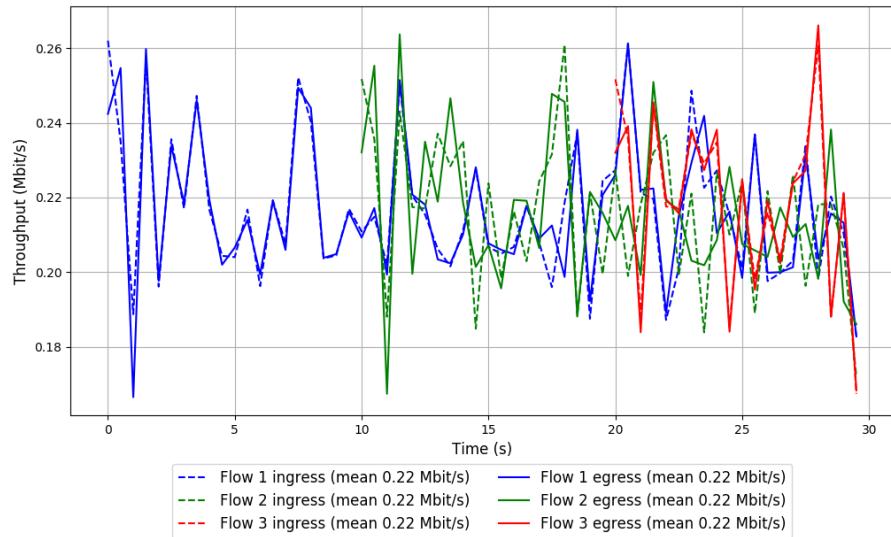


```
Run 1: Statistics of SCReAM
```

```
Start at: 2018-01-16 01:28:51
End at: 2018-01-16 01:29:21
Local clock offset: -16.841 ms
Remote clock offset: -16.719 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 32.360 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 32.543 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 32.337 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 29.370 ms
Loss rate: 0.35%
```

Run 1: Report of SCReAM — Data Link

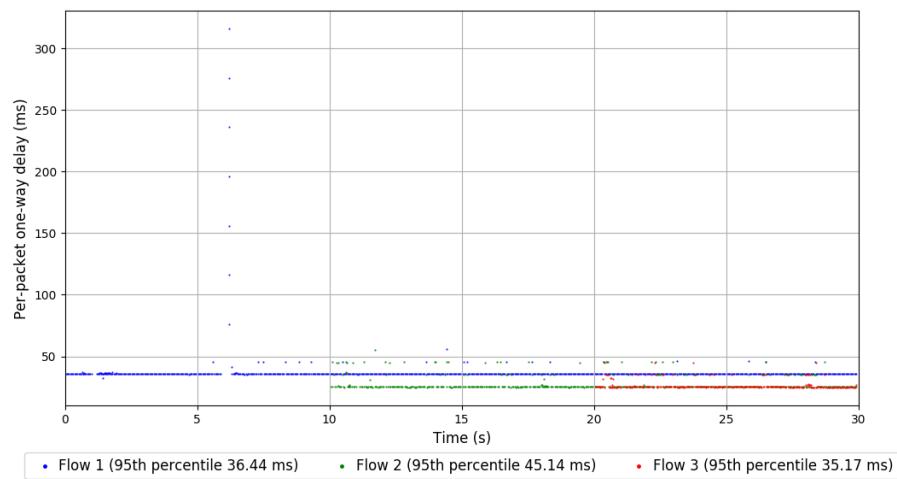
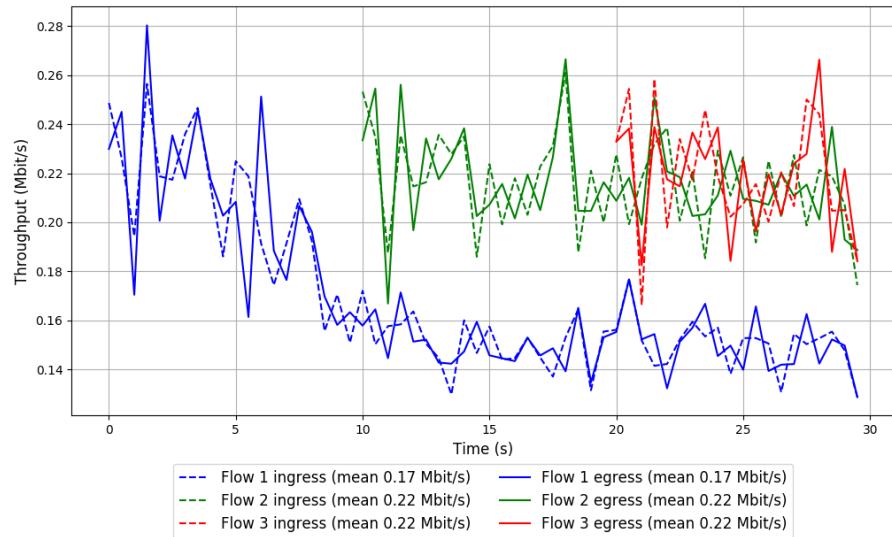


Run 2: Statistics of SCReAM

```
Start at: 2018-01-16 01:45:30
End at: 2018-01-16 01:46:00
Local clock offset: -18.501 ms
Remote clock offset: -15.925 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 36.410 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 36.439 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 45.140 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 35.168 ms
Loss rate: 0.00%
```

Run 2: Report of SCReAM — Data Link

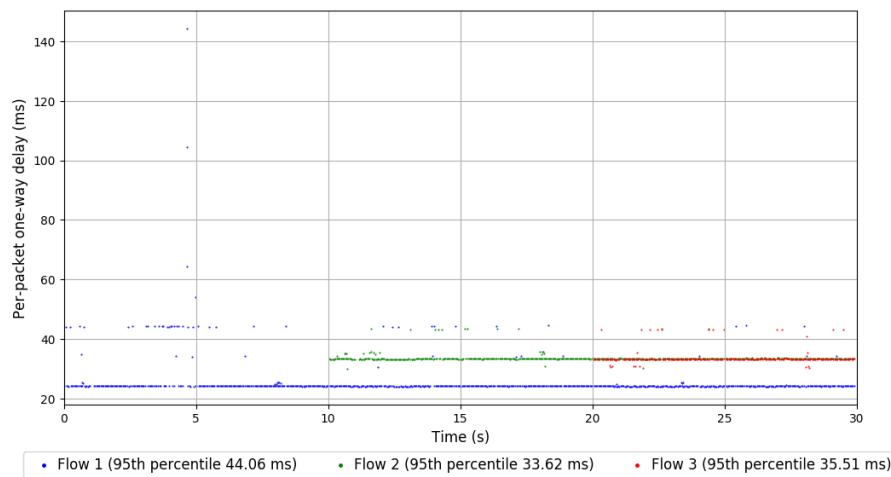
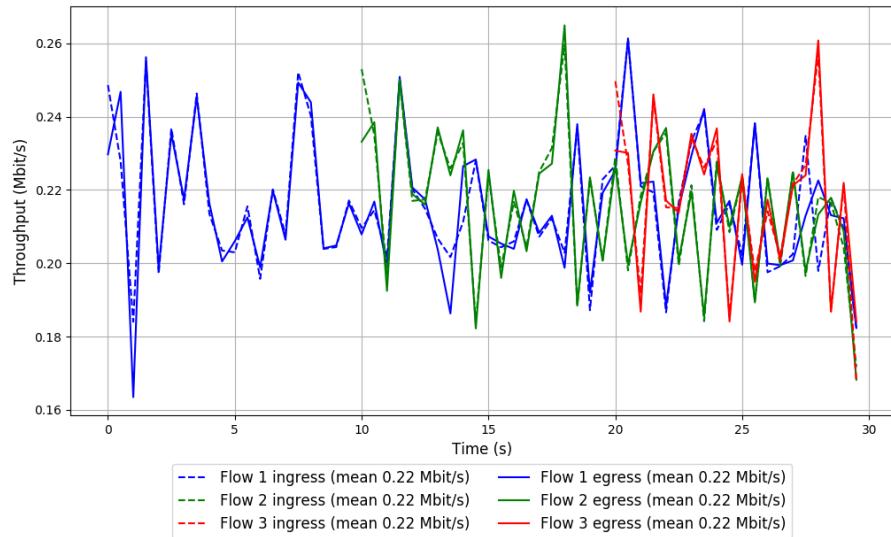


Run 3: Statistics of SCReAM

```
Start at: 2018-01-16 02:02:07
End at: 2018-01-16 02:02:37
Local clock offset: -20.82 ms
Remote clock offset: -16.95 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 35.119 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 44.056 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 33.622 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 35.505 ms
Loss rate: 0.00%
```

Run 3: Report of SCReAM — Data Link

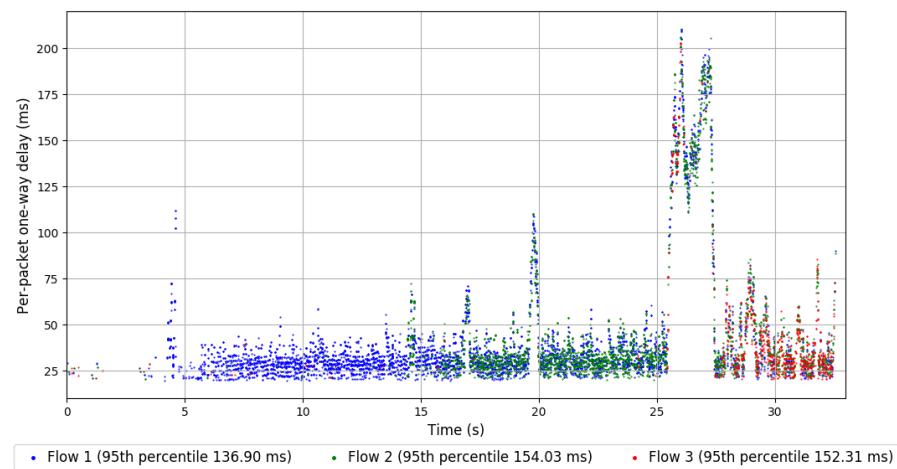
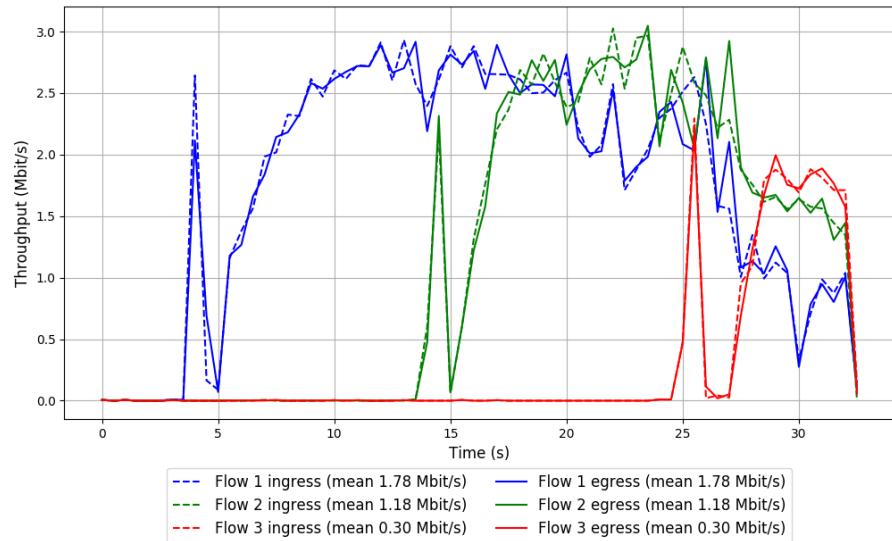


```
Run 1: Statistics of WebRTC media

Start at: 2018-01-16 01:27:45
End at: 2018-01-16 01:28:15
Local clock offset: -15.725 ms
Remote clock offset: -16.629 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.25 Mbit/s
95th percentile per-packet one-way delay: 144.815 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 1.78 Mbit/s
95th percentile per-packet one-way delay: 136.897 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 154.034 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 152.305 ms
Loss rate: 1.44%
```

Run 1: Report of WebRTC media — Data Link

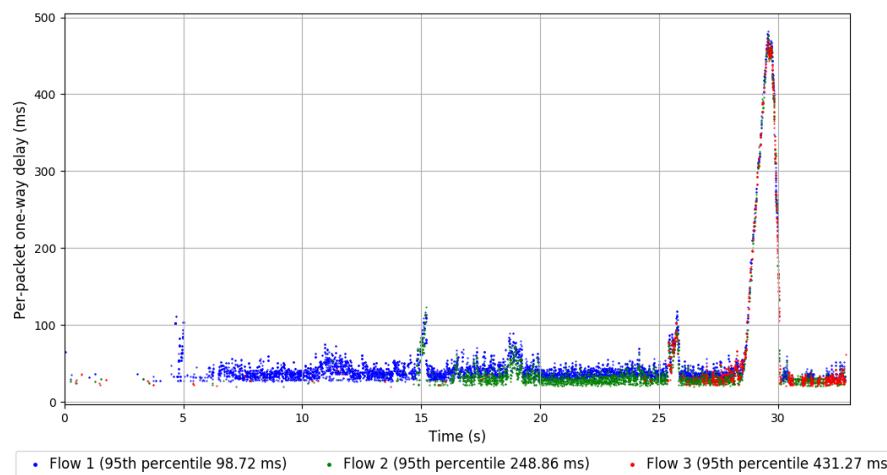
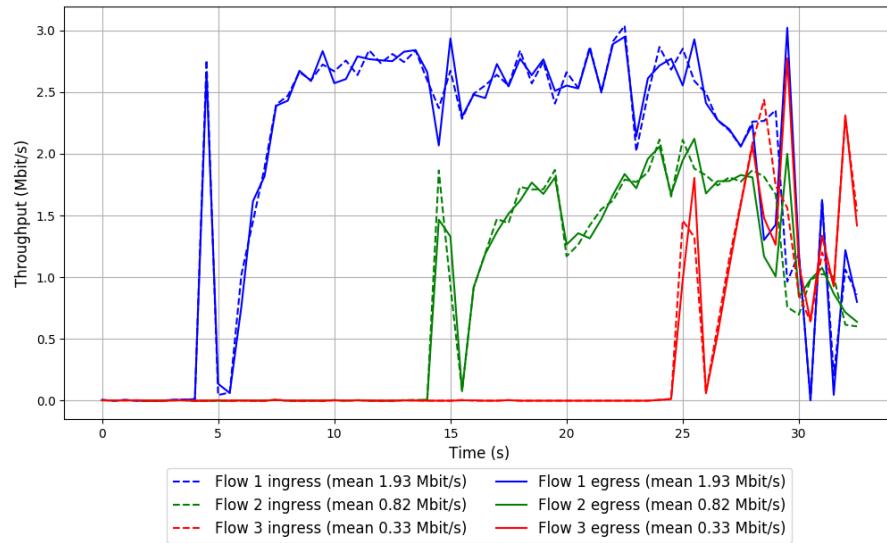


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-16 01:44:24
End at: 2018-01-16 01:44:54
Local clock offset: -16.295 ms
Remote clock offset: -16.762 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 250.996 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 1.93 Mbit/s
95th percentile per-packet one-way delay: 98.720 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 248.862 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 431.268 ms
Loss rate: 0.61%
```

Run 2: Report of WebRTC media — Data Link

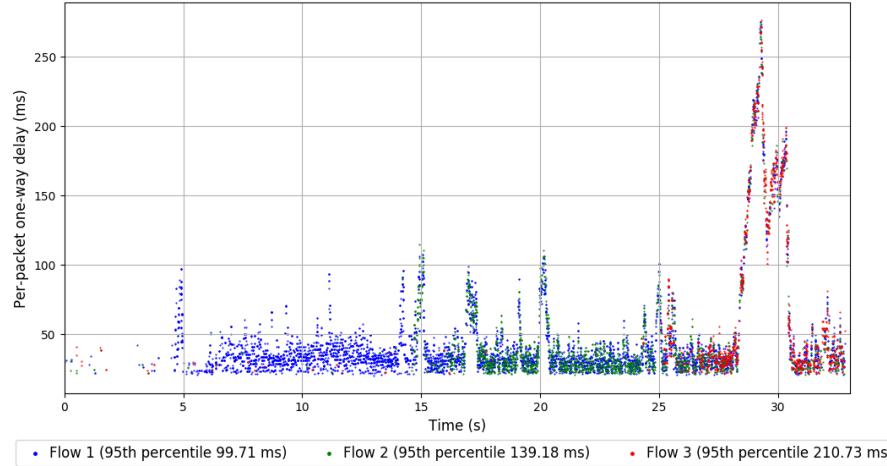
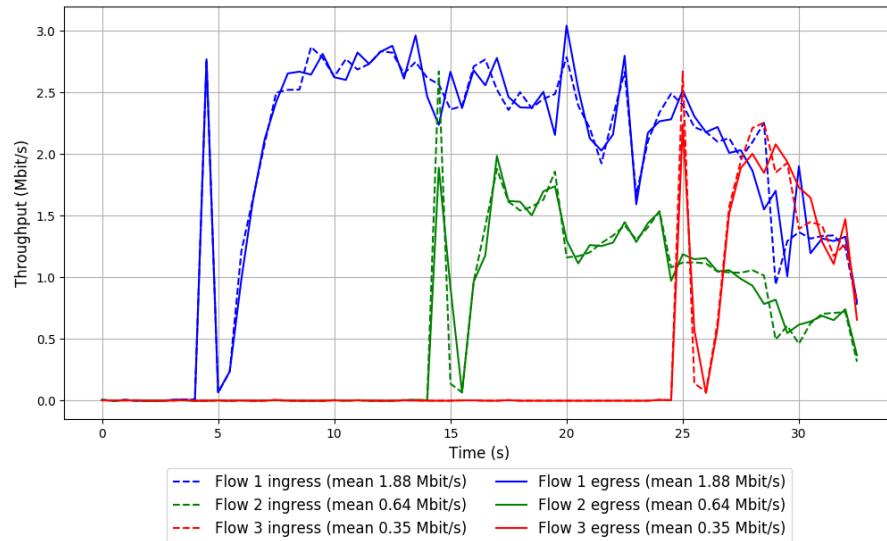


```
Run 3: Statistics of WebRTC media

Start at: 2018-01-16 02:01:01
End at: 2018-01-16 02:01:31
Local clock offset: -19.045 ms
Remote clock offset: -16.289 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.86 Mbit/s
95th percentile per-packet one-way delay: 159.036 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 1.88 Mbit/s
95th percentile per-packet one-way delay: 99.714 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 139.176 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 210.734 ms
Loss rate: 0.72%
```

Run 3: Report of WebRTC media — Data Link

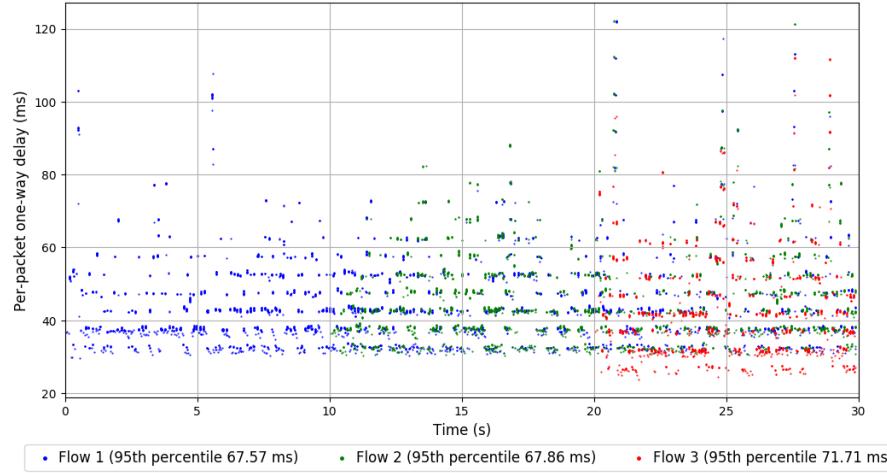
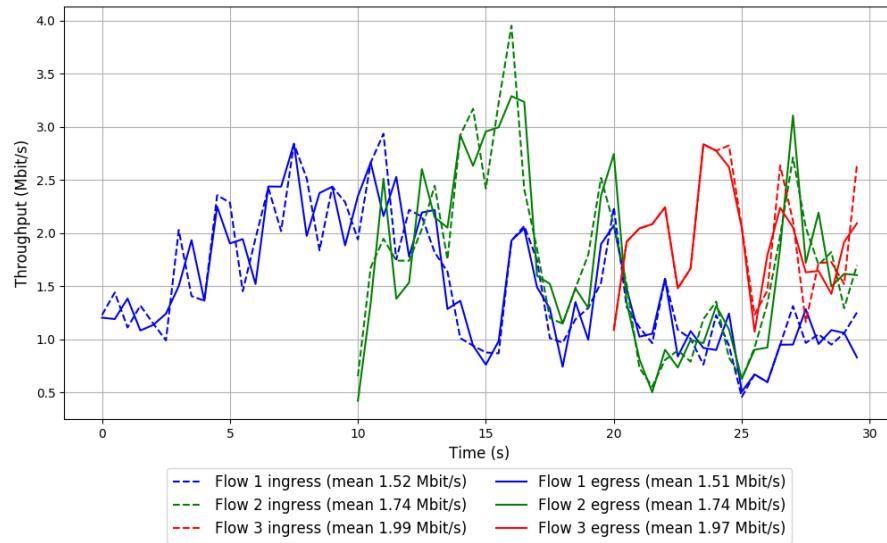


Run 1: Statistics of Sprout

```
Start at: 2018-01-16 01:14:28
End at: 2018-01-16 01:14:58
Local clock offset: -20.0 ms
Remote clock offset: -17.725 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.31 Mbit/s
95th percentile per-packet one-way delay: 67.840 ms
Loss rate: 0.54%
-- Flow 1:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 67.569 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 1.74 Mbit/s
95th percentile per-packet one-way delay: 67.862 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 71.709 ms
Loss rate: 1.40%
```

Run 1: Report of Sprout — Data Link

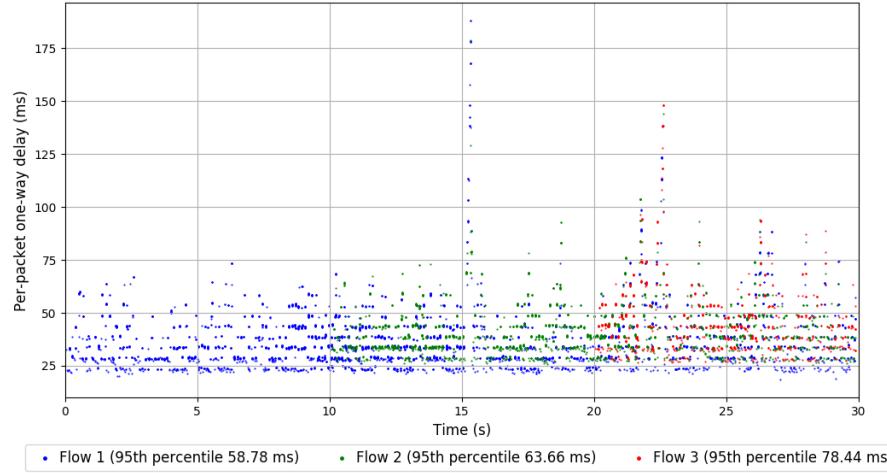
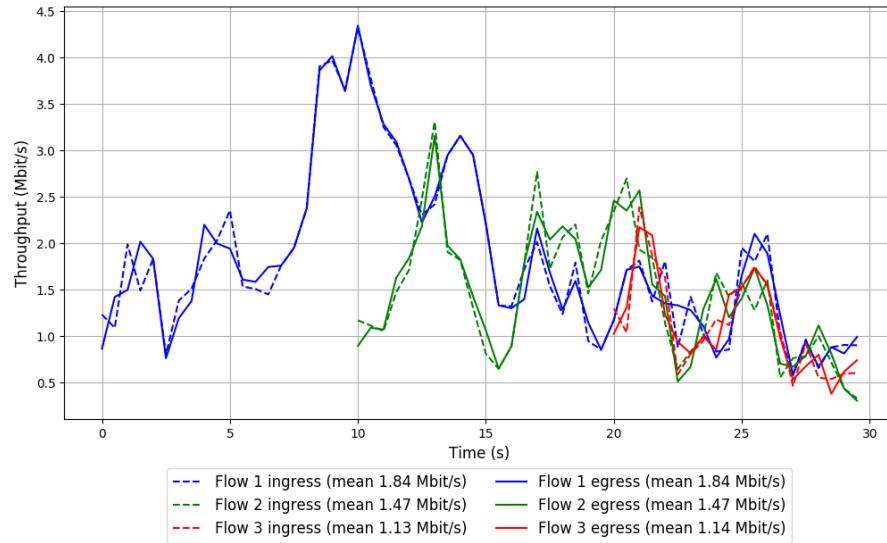


Run 2: Statistics of Sprout

```
Start at: 2018-01-16 01:31:05
End at: 2018-01-16 01:31:35
Local clock offset: -15.99 ms
Remote clock offset: -17.287 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.20 Mbit/s
95th percentile per-packet one-way delay: 63.930 ms
Loss rate: 0.02%
-- Flow 1:
Average throughput: 1.84 Mbit/s
95th percentile per-packet one-way delay: 58.776 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.47 Mbit/s
95th percentile per-packet one-way delay: 63.660 ms
Loss rate: 0.05%
-- Flow 3:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 78.437 ms
Loss rate: 0.01%
```

Run 2: Report of Sprout — Data Link

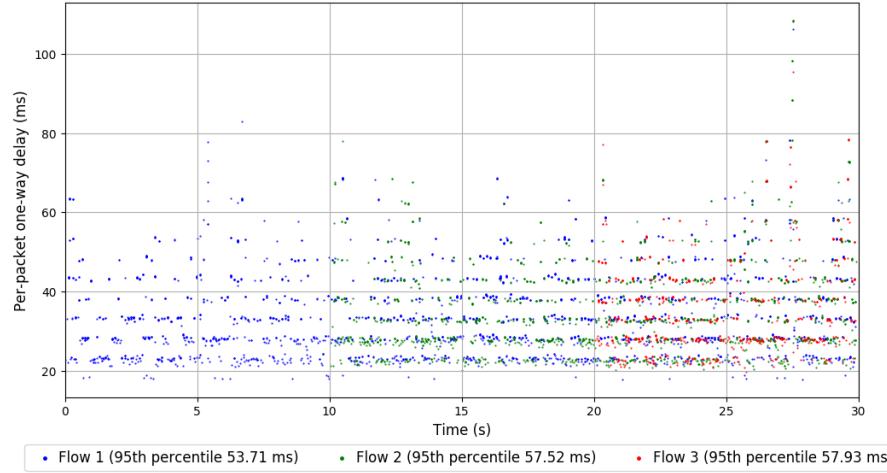
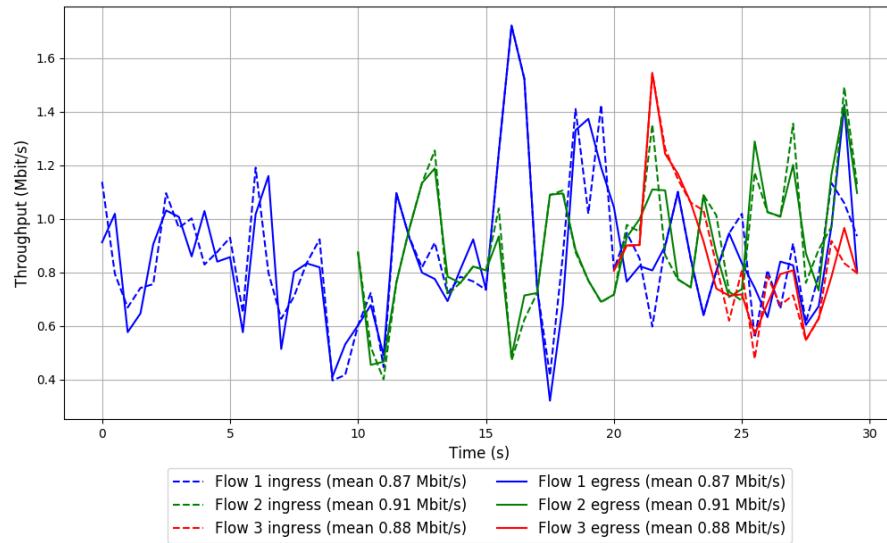


Run 3: Statistics of Sprout

```
Start at: 2018-01-16 01:47:44
End at: 2018-01-16 01:48:14
Local clock offset: -15.438 ms
Remote clock offset: -16.599 ms

# Below is generated by plot.py at 2018-01-16 02:04:32
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 55.358 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 53.713 ms
Loss rate: 0.26%
-- Flow 2:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 57.522 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 57.928 ms
Loss rate: 0.01%
```

Run 3: Report of Sprout — Data Link

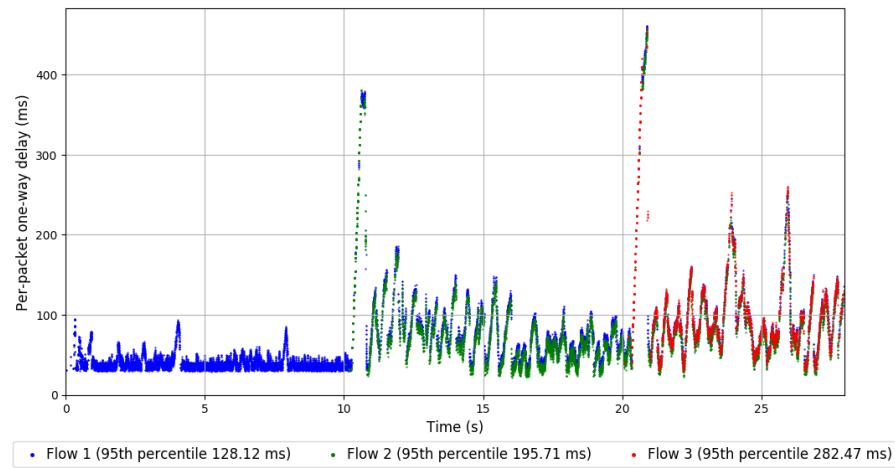
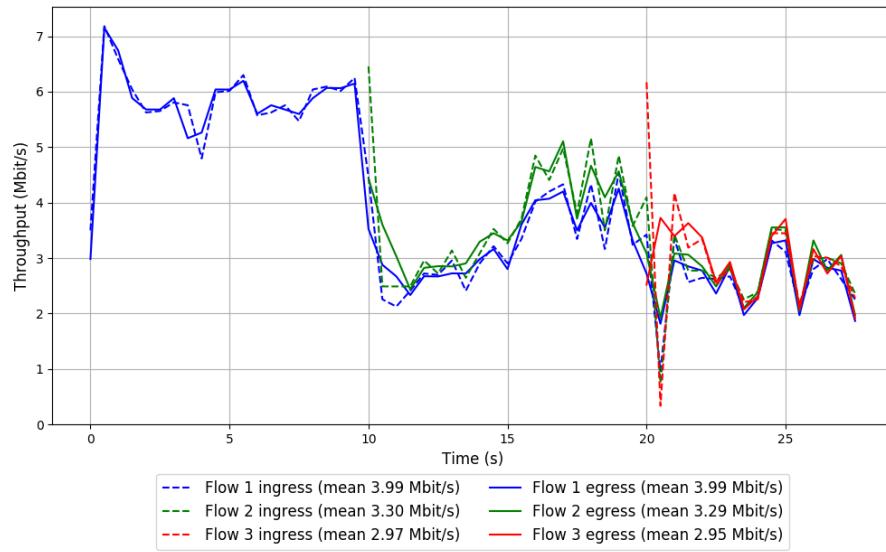


```
Run 1: Statistics of TaoVA-100x
```

```
Start at: 2018-01-16 01:18:52
End at: 2018-01-16 01:19:22
Local clock offset: -17.72 ms
Remote clock offset: -15.061 ms

# Below is generated by plot.py at 2018-01-16 02:04:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.93 Mbit/s
95th percentile per-packet one-way delay: 164.068 ms
Loss rate: 0.53%
-- Flow 1:
Average throughput: 3.99 Mbit/s
95th percentile per-packet one-way delay: 128.118 ms
Loss rate: 0.31%
-- Flow 2:
Average throughput: 3.29 Mbit/s
95th percentile per-packet one-way delay: 195.714 ms
Loss rate: 0.57%
-- Flow 3:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 282.472 ms
Loss rate: 1.48%
```

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

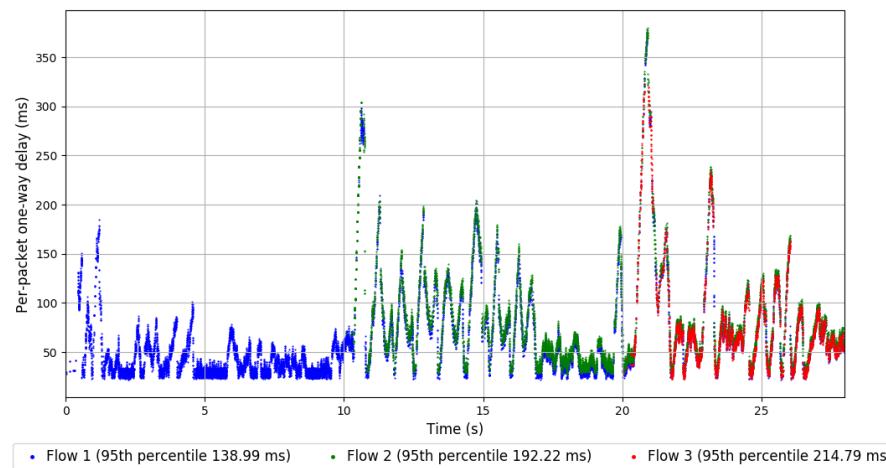
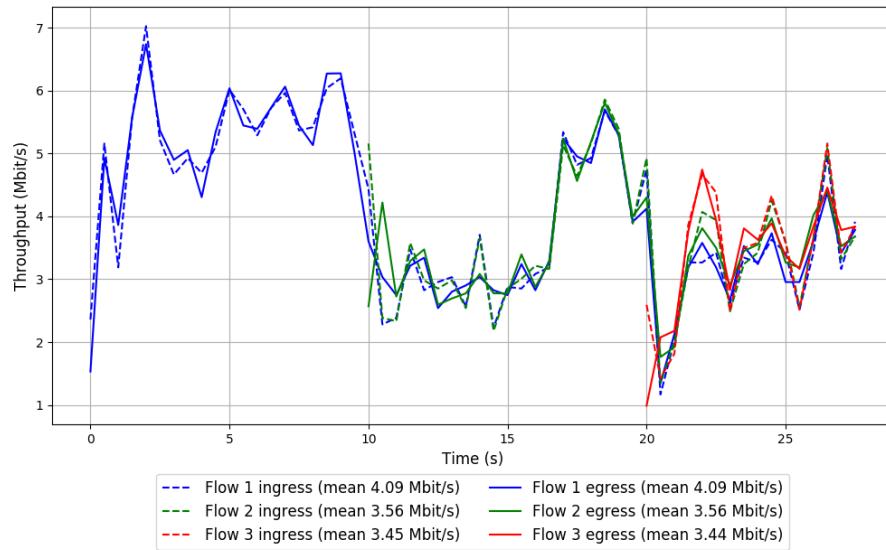


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-16 01:35:31
End at: 2018-01-16 01:36:01
Local clock offset: -16.058 ms
Remote clock offset: -16.132 ms

# Below is generated by plot.py at 2018-01-16 02:04:42
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.34 Mbit/s
95th percentile per-packet one-way delay: 163.133 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 4.09 Mbit/s
95th percentile per-packet one-way delay: 138.986 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 3.56 Mbit/s
95th percentile per-packet one-way delay: 192.215 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 214.791 ms
Loss rate: 0.95%
```

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

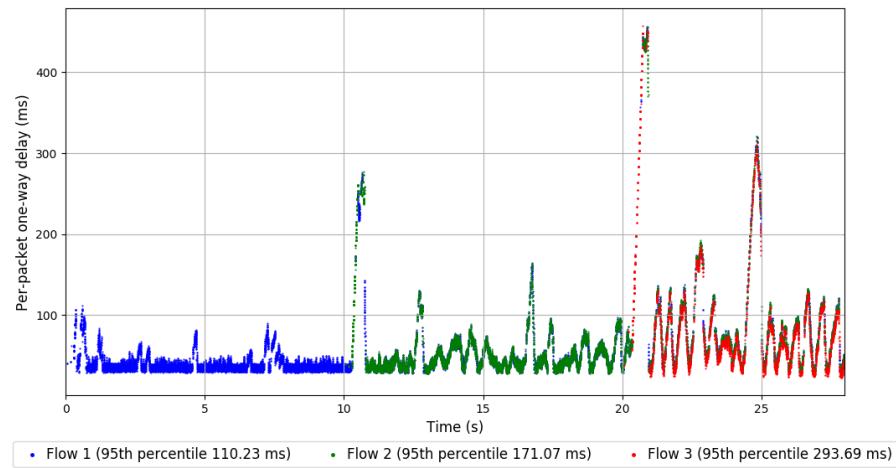
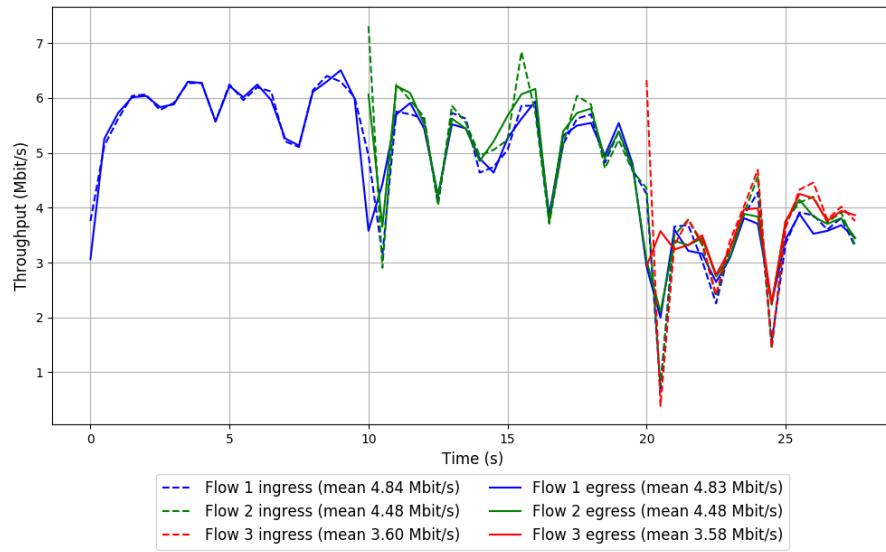


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-01-16 01:52:09
End at: 2018-01-16 01:52:39
Local clock offset: -17.803 ms
Remote clock offset: -15.103 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.72 Mbit/s
95th percentile per-packet one-way delay: 155.673 ms
Loss rate: 0.40%
-- Flow 1:
Average throughput: 4.83 Mbit/s
95th percentile per-packet one-way delay: 110.226 ms
Loss rate: 0.24%
-- Flow 2:
Average throughput: 4.48 Mbit/s
95th percentile per-packet one-way delay: 171.074 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 3.58 Mbit/s
95th percentile per-packet one-way delay: 293.690 ms
Loss rate: 1.09%
```

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

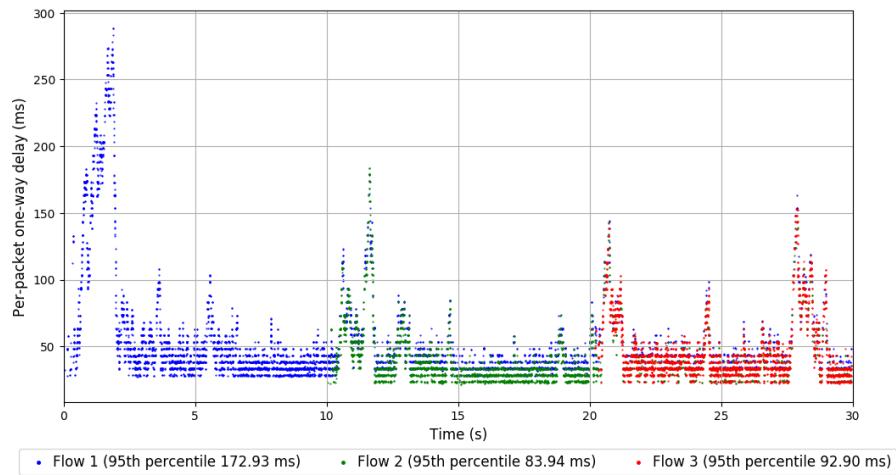
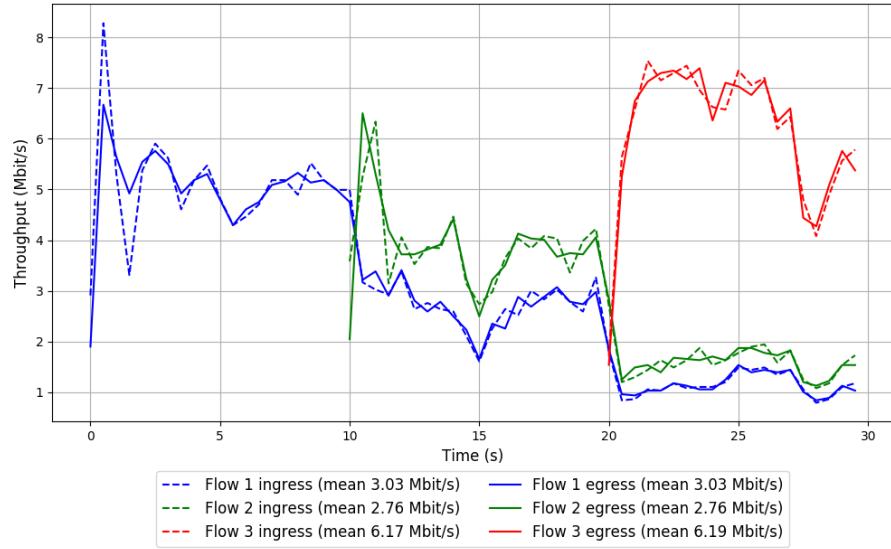


Run 1: Statistics of TCP Vegas

```
Start at: 2018-01-16 01:26:39
End at: 2018-01-16 01:27:09
Local clock offset: -15.855 ms
Remote clock offset: -15.781 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.91 Mbit/s
95th percentile per-packet one-way delay: 113.188 ms
Loss rate: 0.32%
-- Flow 1:
Average throughput: 3.03 Mbit/s
95th percentile per-packet one-way delay: 172.934 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 83.937 ms
Loss rate: 0.37%
-- Flow 3:
Average throughput: 6.19 Mbit/s
95th percentile per-packet one-way delay: 92.898 ms
Loss rate: 0.49%
```

Run 1: Report of TCP Vegas — Data Link

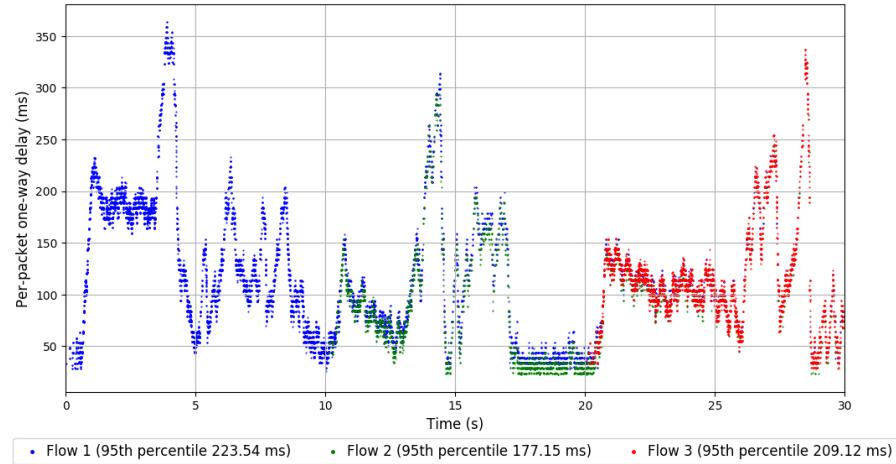
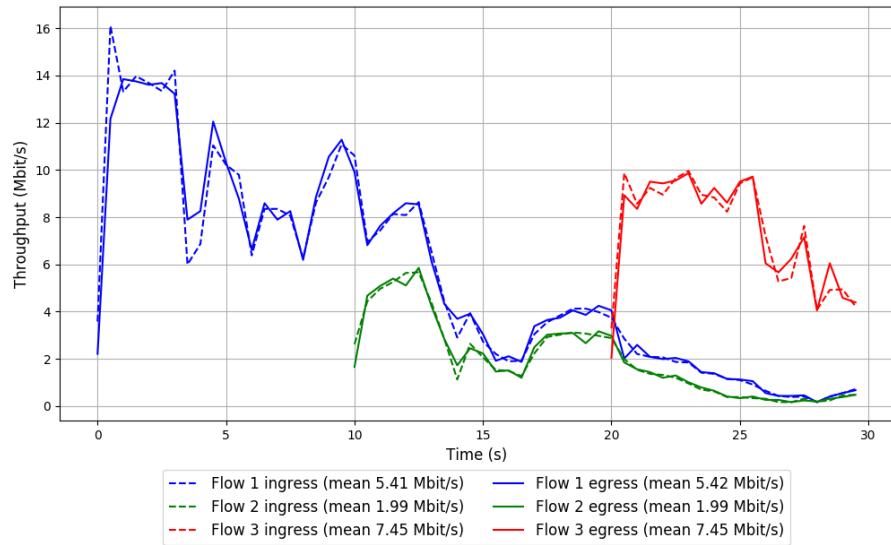


Run 2: Statistics of TCP Vegas

```
Start at: 2018-01-16 01:43:17
End at: 2018-01-16 01:43:47
Local clock offset: -16.312 ms
Remote clock offset: -16.395 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.21 Mbit/s
95th percentile per-packet one-way delay: 214.430 ms
Loss rate: 0.21%
-- Flow 1:
Average throughput: 5.42 Mbit/s
95th percentile per-packet one-way delay: 223.543 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 177.149 ms
Loss rate: 0.12%
-- Flow 3:
Average throughput: 7.45 Mbit/s
95th percentile per-packet one-way delay: 209.119 ms
Loss rate: 0.58%
```

Run 2: Report of TCP Vegas — Data Link

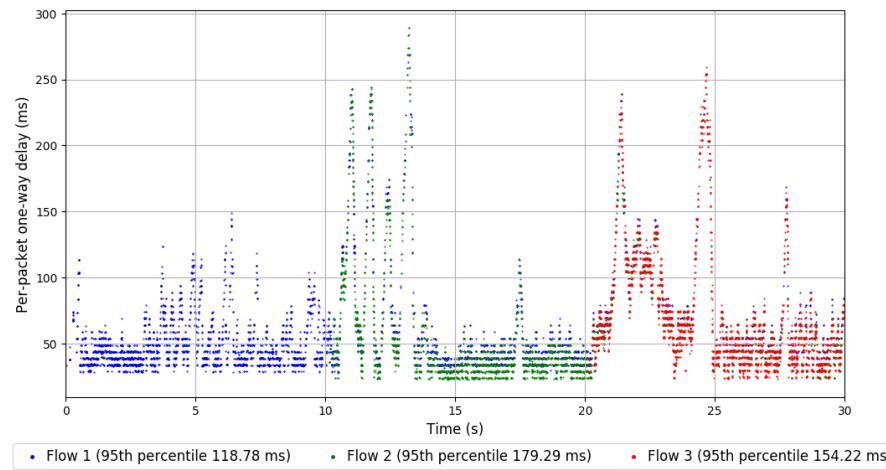
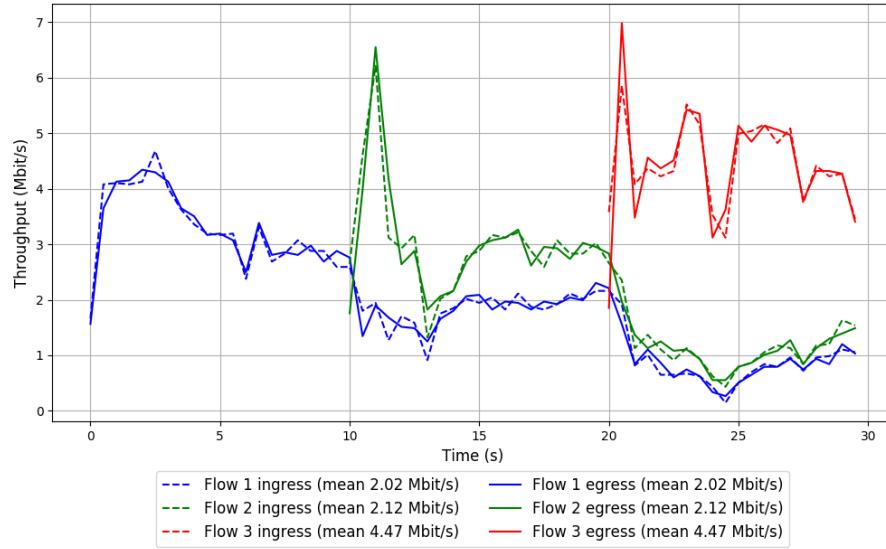


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-16 01:59:55
End at: 2018-01-16 02:00:25
Local clock offset: -18.154 ms
Remote clock offset: -15.645 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.90 Mbit/s
95th percentile per-packet one-way delay: 149.101 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 118.776 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 2.12 Mbit/s
95th percentile per-packet one-way delay: 179.293 ms
Loss rate: 0.40%
-- Flow 3:
Average throughput: 4.47 Mbit/s
95th percentile per-packet one-way delay: 154.223 ms
Loss rate: 0.49%
```

Run 3: Report of TCP Vegas — Data Link

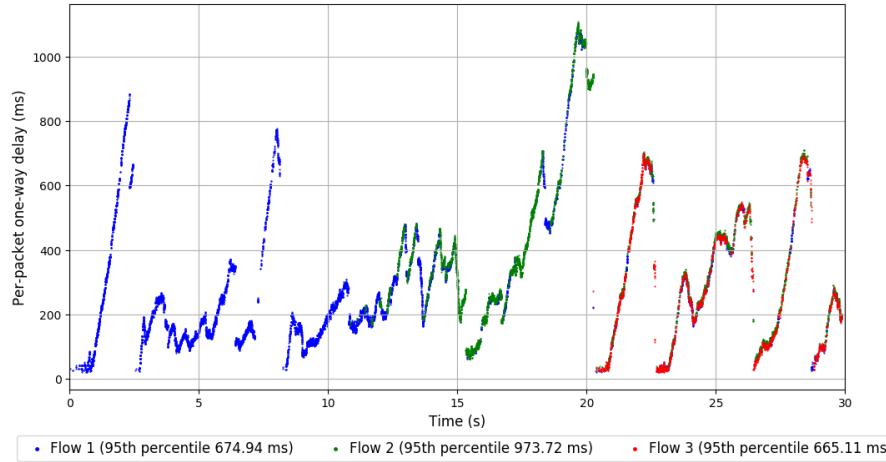
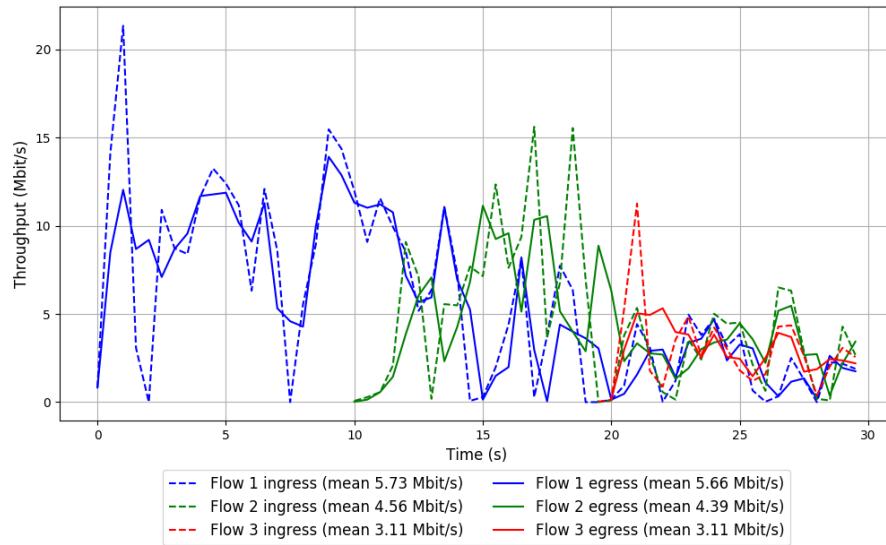


Run 1: Statistics of Verus

```
Start at: 2018-01-16 01:17:45
End at: 2018-01-16 01:18:15
Local clock offset: -18.721 ms
Remote clock offset: -17.256 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.55 Mbit/s
95th percentile per-packet one-way delay: 762.013 ms
Loss rate: 2.63%
-- Flow 1:
Average throughput: 5.66 Mbit/s
95th percentile per-packet one-way delay: 674.944 ms
Loss rate: 1.39%
-- Flow 2:
Average throughput: 4.39 Mbit/s
95th percentile per-packet one-way delay: 973.721 ms
Loss rate: 4.92%
-- Flow 3:
Average throughput: 3.11 Mbit/s
95th percentile per-packet one-way delay: 665.114 ms
Loss rate: 2.84%
```

Run 1: Report of Verus — Data Link

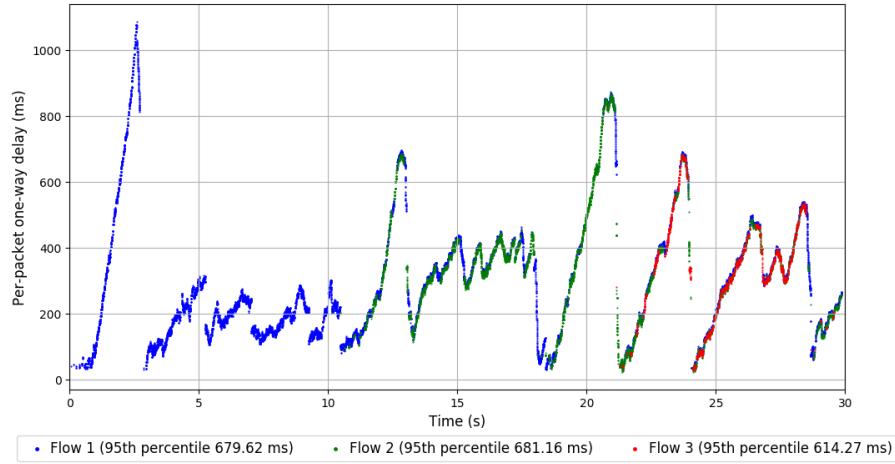
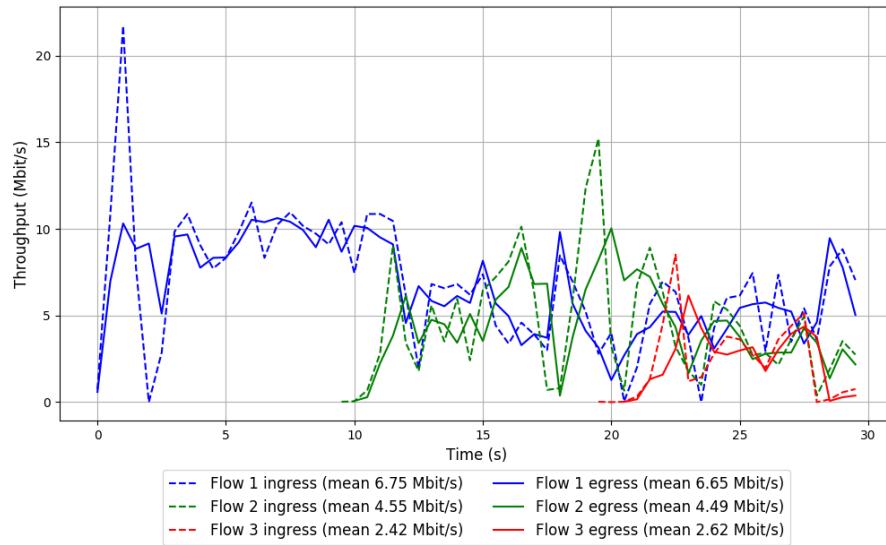


Run 2: Statistics of Verus

```
Start at: 2018-01-16 01:34:24
End at: 2018-01-16 01:34:54
Local clock offset: -19.03 ms
Remote clock offset: -17.69 ms

# Below is generated by plot.py at 2018-01-16 02:04:47
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.38 Mbit/s
95th percentile per-packet one-way delay: 675.023 ms
Loss rate: 1.87%
-- Flow 1:
Average throughput: 6.65 Mbit/s
95th percentile per-packet one-way delay: 679.616 ms
Loss rate: 1.74%
-- Flow 2:
Average throughput: 4.49 Mbit/s
95th percentile per-packet one-way delay: 681.156 ms
Loss rate: 2.19%
-- Flow 3:
Average throughput: 2.62 Mbit/s
95th percentile per-packet one-way delay: 614.275 ms
Loss rate: 1.82%
```

Run 2: Report of Verus — Data Link

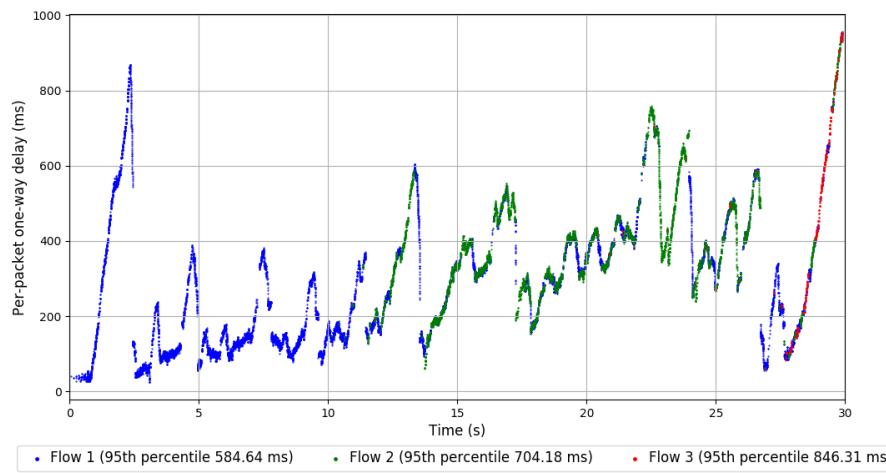
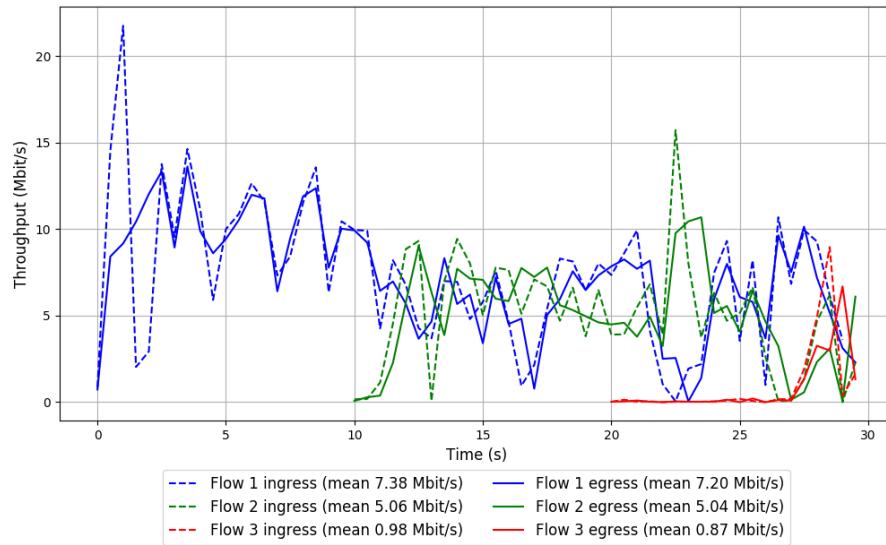


Run 3: Statistics of Verus

```
Start at: 2018-01-16 01:51:03
End at: 2018-01-16 01:51:33
Local clock offset: -19.588 ms
Remote clock offset: -16.981 ms

# Below is generated by plot.py at 2018-01-16 02:04:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.80 Mbit/s
95th percentile per-packet one-way delay: 660.605 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 7.20 Mbit/s
95th percentile per-packet one-way delay: 584.642 ms
Loss rate: 1.06%
-- Flow 2:
Average throughput: 5.04 Mbit/s
95th percentile per-packet one-way delay: 704.180 ms
Loss rate: 1.41%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 846.310 ms
Loss rate: 12.45%
```

Run 3: Report of Verus — Data Link

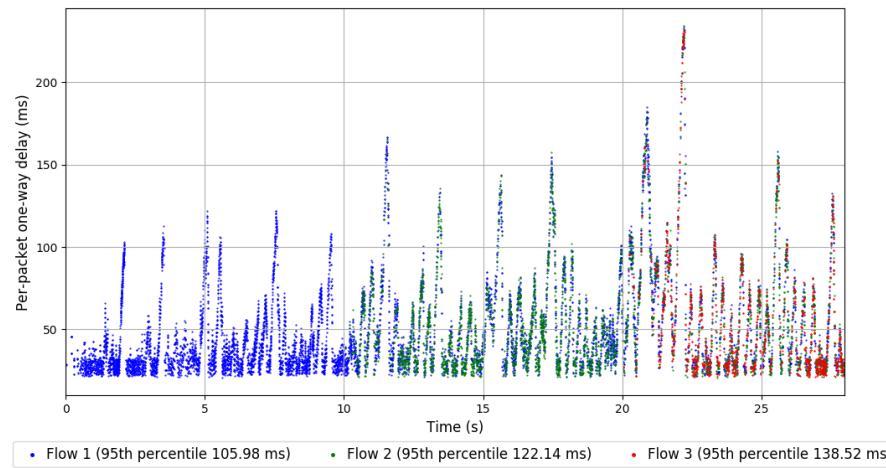
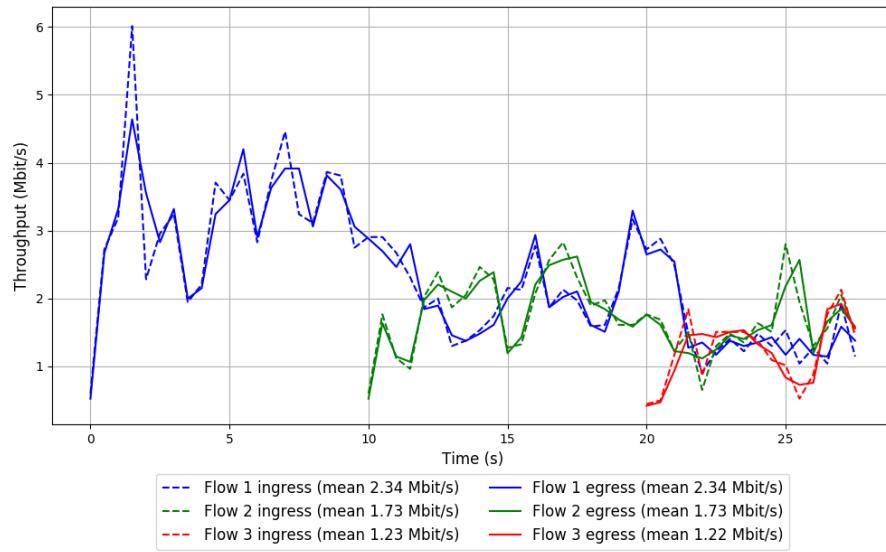


Run 1: Statistics of Copa

```
Start at: 2018-01-16 01:20:00
End at: 2018-01-16 01:20:30
Local clock offset: -17.167 ms
Remote clock offset: -16.167 ms

# Below is generated by plot.py at 2018-01-16 02:04:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.80 Mbit/s
95th percentile per-packet one-way delay: 114.108 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 2.34 Mbit/s
95th percentile per-packet one-way delay: 105.979 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 1.73 Mbit/s
95th percentile per-packet one-way delay: 122.140 ms
Loss rate: 0.33%
-- Flow 3:
Average throughput: 1.22 Mbit/s
95th percentile per-packet one-way delay: 138.517 ms
Loss rate: 0.94%
```

Run 1: Report of Copa — Data Link

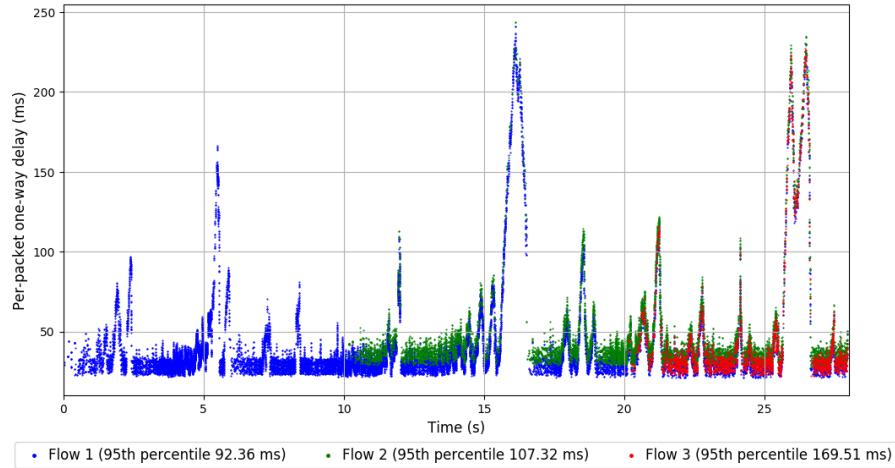
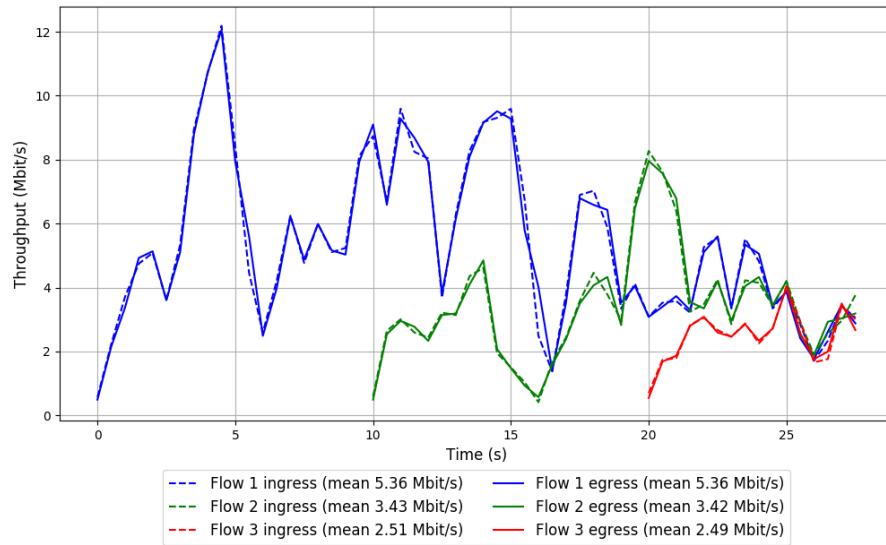


Run 2: Statistics of Copa

```
Start at: 2018-01-16 01:36:38
End at: 2018-01-16 01:37:08
Local clock offset: -18.935 ms
Remote clock offset: -18.165 ms

# Below is generated by plot.py at 2018-01-16 02:04:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.26 Mbit/s
95th percentile per-packet one-way delay: 103.490 ms
Loss rate: 0.35%
-- Flow 1:
Average throughput: 5.36 Mbit/s
95th percentile per-packet one-way delay: 92.358 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 3.42 Mbit/s
95th percentile per-packet one-way delay: 107.316 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 2.49 Mbit/s
95th percentile per-packet one-way delay: 169.512 ms
Loss rate: 1.16%
```

Run 2: Report of Copa — Data Link

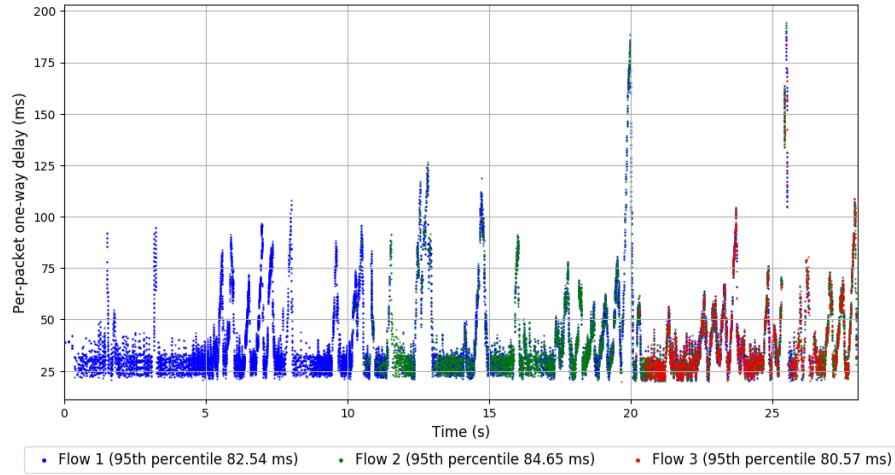
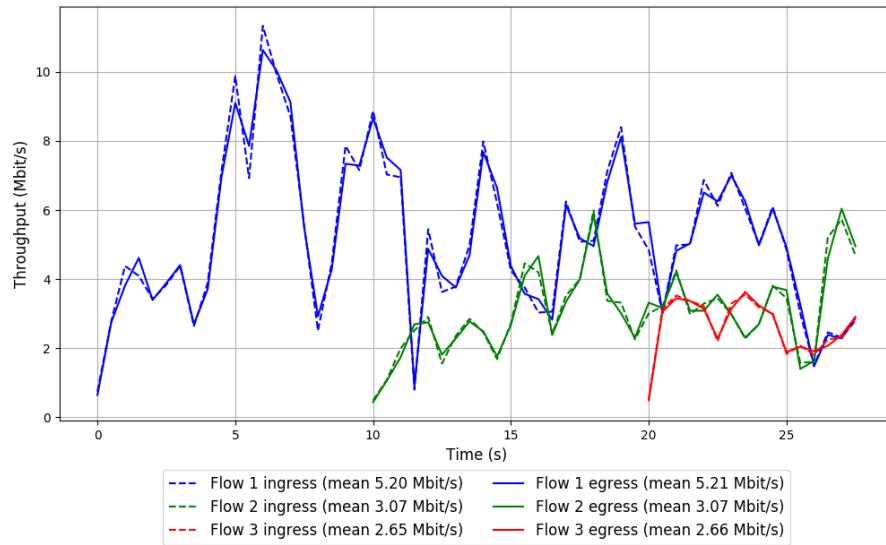


Run 3: Statistics of Copa

```
Start at: 2018-01-16 01:53:16
End at: 2018-01-16 01:53:46
Local clock offset: -17.371 ms
Remote clock offset: -16.101 ms

# Below is generated by plot.py at 2018-01-16 02:04:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.93 Mbit/s
95th percentile per-packet one-way delay: 82.854 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 5.21 Mbit/s
95th percentile per-packet one-way delay: 82.542 ms
Loss rate: 0.05%
-- Flow 2:
Average throughput: 3.07 Mbit/s
95th percentile per-packet one-way delay: 84.653 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 2.66 Mbit/s
95th percentile per-packet one-way delay: 80.573 ms
Loss rate: 0.37%
```

Run 3: Report of Copa — Data Link

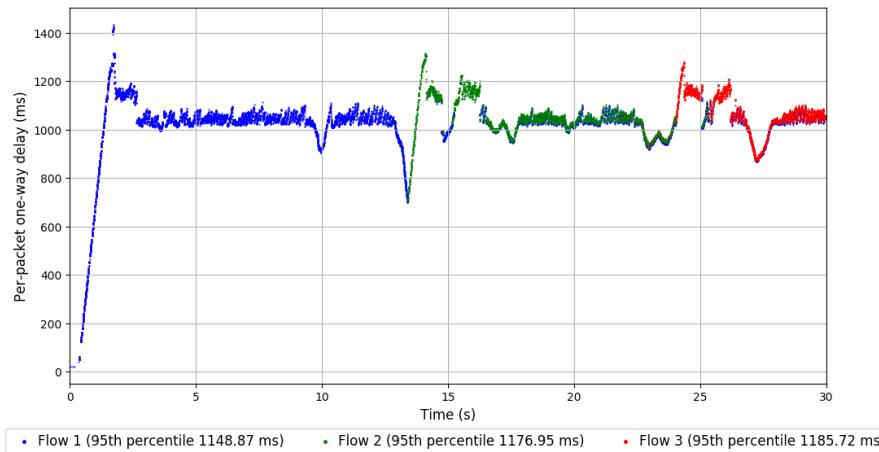
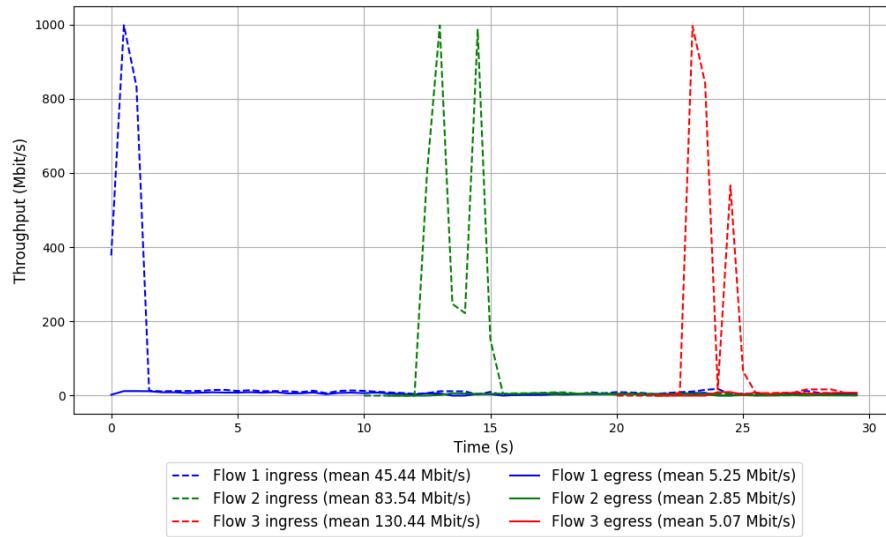


```
Run 1: Statistics of FillP

Start at: 2018-01-16 01:13:19
End at: 2018-01-16 01:13:49
Local clock offset: -15.16 ms
Remote clock offset: -17.964 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 8.38 Mbit/s
95th percentile per-packet one-way delay: 1167.282 ms
Loss rate: 94.19%
-- Flow 1:
Average throughput: 5.25 Mbit/s
95th percentile per-packet one-way delay: 1148.872 ms
Loss rate: 88.47%
-- Flow 2:
Average throughput: 2.85 Mbit/s
95th percentile per-packet one-way delay: 1176.947 ms
Loss rate: 96.83%
-- Flow 3:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 1185.721 ms
Loss rate: 96.83%
```

Run 1: Report of FillP — Data Link

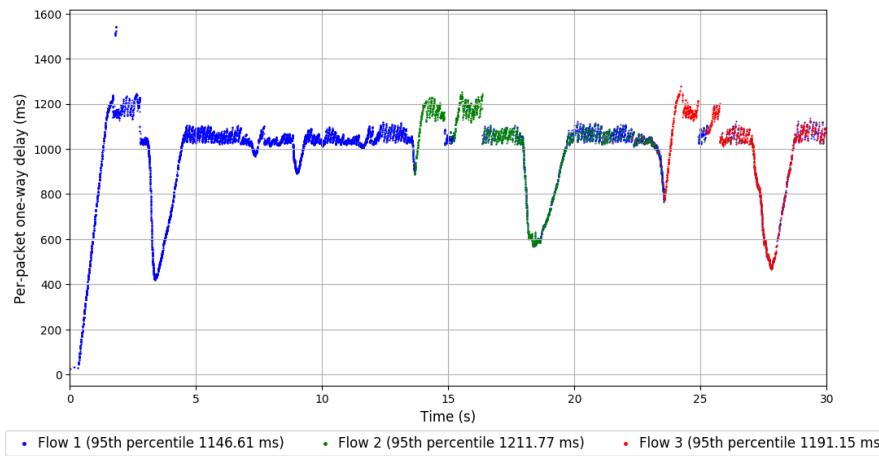
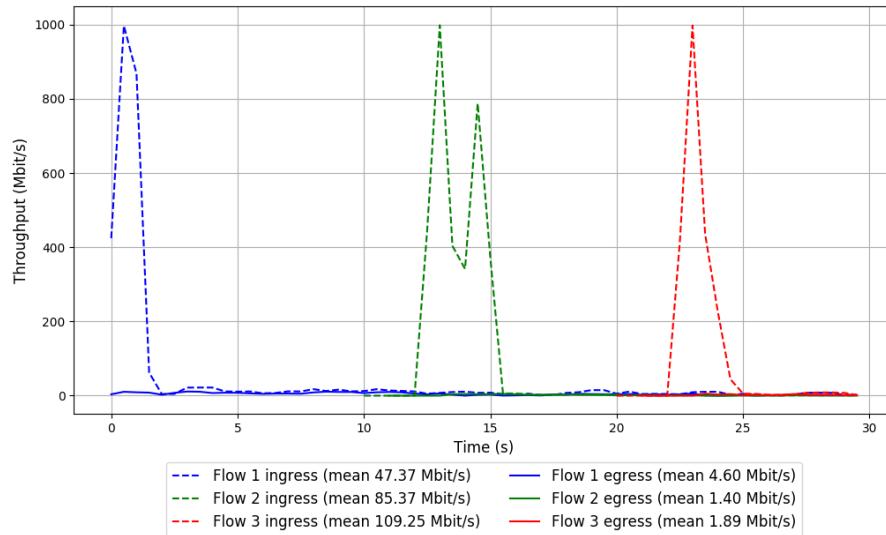


Run 2: Statistics of FillP

```
Start at: 2018-01-16 01:29:57
End at: 2018-01-16 01:30:27
Local clock offset: -17.468 ms
Remote clock offset: -16.651 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.02 Mbit/s
95th percentile per-packet one-way delay: 1183.239 ms
Loss rate: 95.71%
-- Flow 1:
Average throughput: 4.60 Mbit/s
95th percentile per-packet one-way delay: 1146.609 ms
Loss rate: 90.30%
-- Flow 2:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 1211.774 ms
Loss rate: 98.47%
-- Flow 3:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 1191.147 ms
Loss rate: 98.48%
```

Run 2: Report of FillP — Data Link

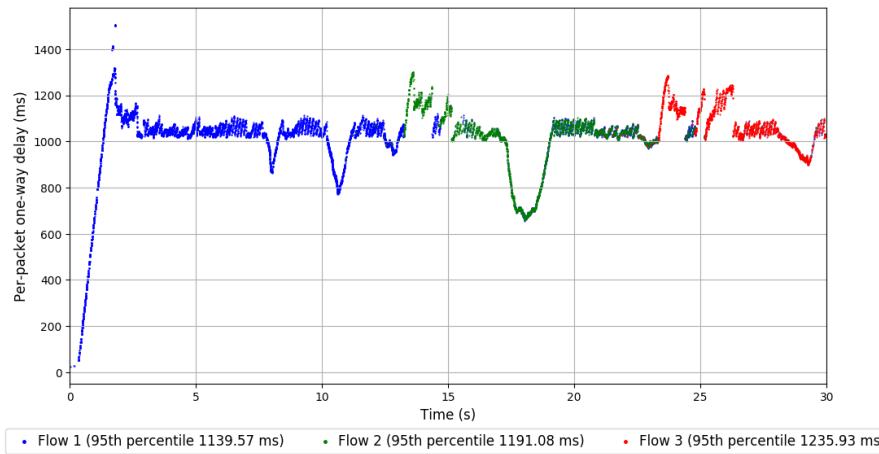
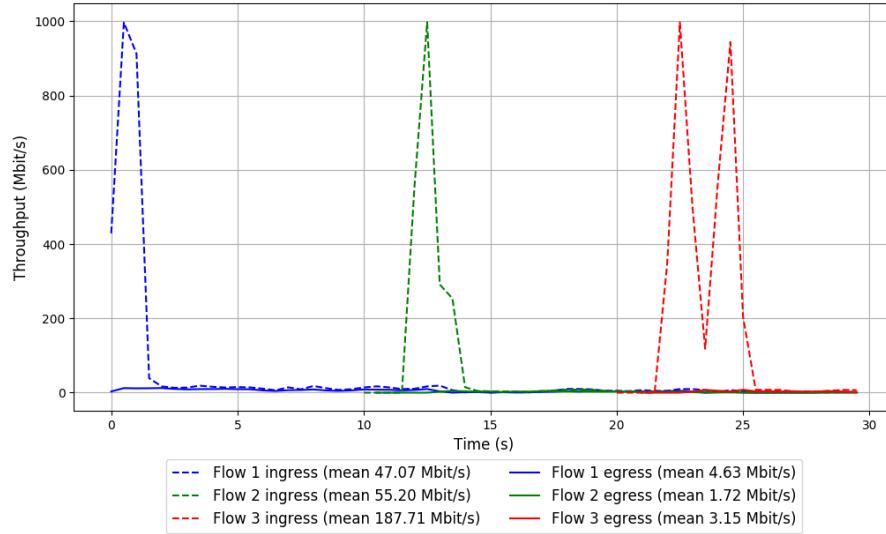


Run 3: Statistics of FillP

```
Start at: 2018-01-16 01:46:36
End at: 2018-01-16 01:47:06
Local clock offset: -16.26 ms
Remote clock offset: -16.932 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.65 Mbit/s
95th percentile per-packet one-way delay: 1188.365 ms
Loss rate: 95.45%
-- Flow 1:
Average throughput: 4.63 Mbit/s
95th percentile per-packet one-way delay: 1139.572 ms
Loss rate: 90.18%
-- Flow 2:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 1191.081 ms
Loss rate: 97.03%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 1235.927 ms
Loss rate: 98.50%
```

Run 3: Report of FillP — Data Link

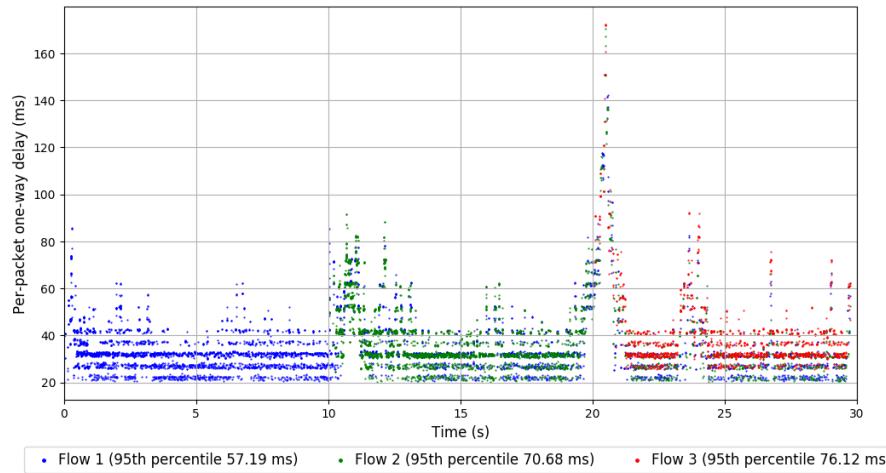
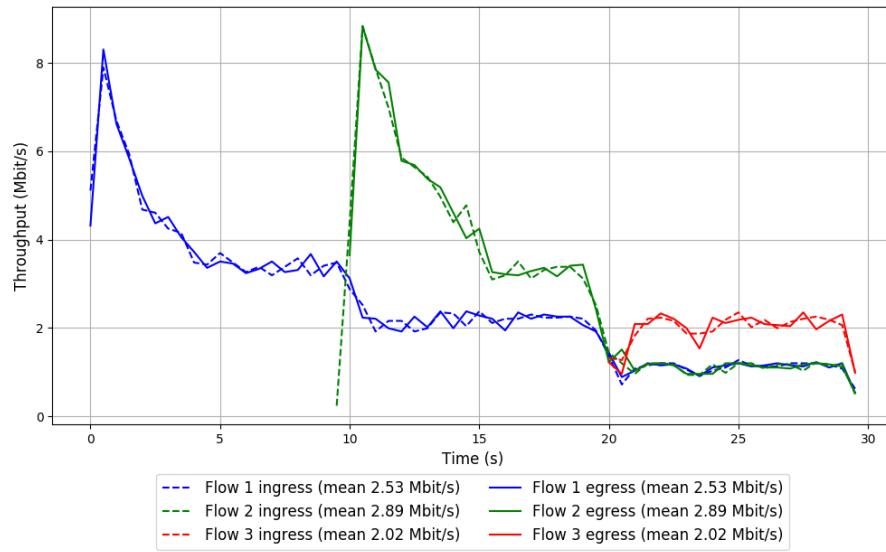


Run 1: Statistics of Indigo

```
Start at: 2018-01-16 01:25:32
End at: 2018-01-16 01:26:02
Local clock offset: -17.195 ms
Remote clock offset: -17.562 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.10 Mbit/s
95th percentile per-packet one-way delay: 62.633 ms
Loss rate: 0.11%
-- Flow 1:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 57.188 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 2.89 Mbit/s
95th percentile per-packet one-way delay: 70.677 ms
Loss rate: 0.06%
-- Flow 3:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 76.120 ms
Loss rate: 0.31%
```

Run 1: Report of Indigo — Data Link

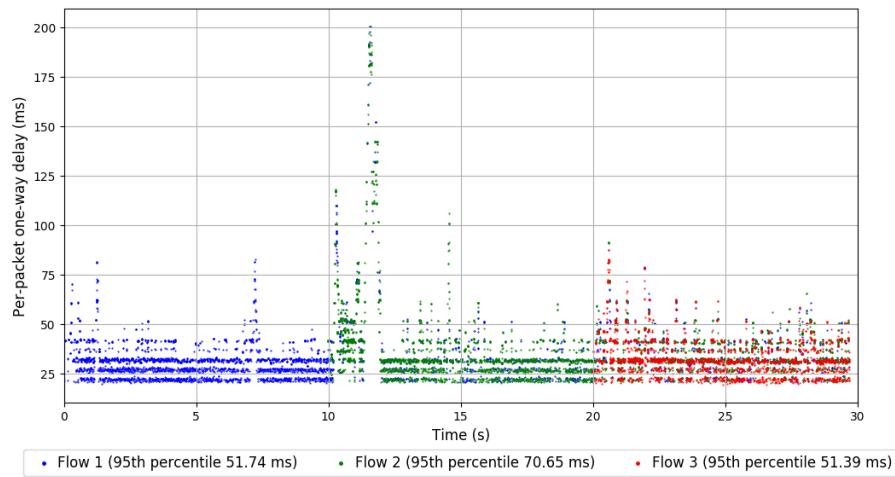
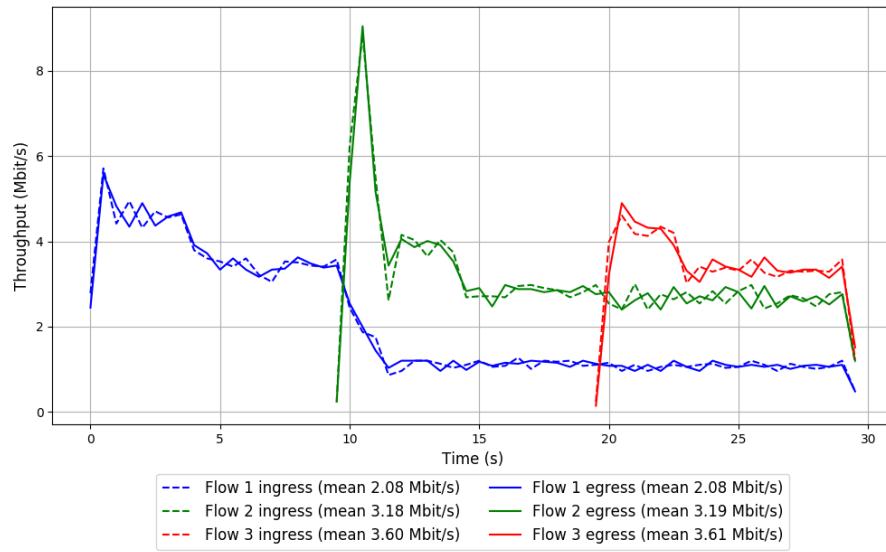


Run 2: Statistics of Indigo

```
Start at: 2018-01-16 01:42:10
End at: 2018-01-16 01:42:40
Local clock offset: -17.021 ms
Remote clock offset: -18.301 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.38 Mbit/s
95th percentile per-packet one-way delay: 57.612 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 2.08 Mbit/s
95th percentile per-packet one-way delay: 51.745 ms
Loss rate: 0.08%
-- Flow 2:
Average throughput: 3.19 Mbit/s
95th percentile per-packet one-way delay: 70.650 ms
Loss rate: 0.19%
-- Flow 3:
Average throughput: 3.61 Mbit/s
95th percentile per-packet one-way delay: 51.387 ms
Loss rate: 0.10%
```

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

```
Start at: 2018-01-16 01:58:48
End at: 2018-01-16 01:59:18
Local clock offset: -20.312 ms
Remote clock offset: -17.049 ms

# Below is generated by plot.py at 2018-01-16 02:05:06
# Datalink statistics
-- Total of 3 flows:
Average throughput: 3.65 Mbit/s
95th percentile per-packet one-way delay: 84.476 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 1.50 Mbit/s
95th percentile per-packet one-way delay: 73.455 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 88.657 ms
Loss rate: 0.04%
-- Flow 3:
Average throughput: 3.19 Mbit/s
95th percentile per-packet one-way delay: 103.454 ms
Loss rate: 0.39%
```

Run 3: Report of Indigo — Data Link

