

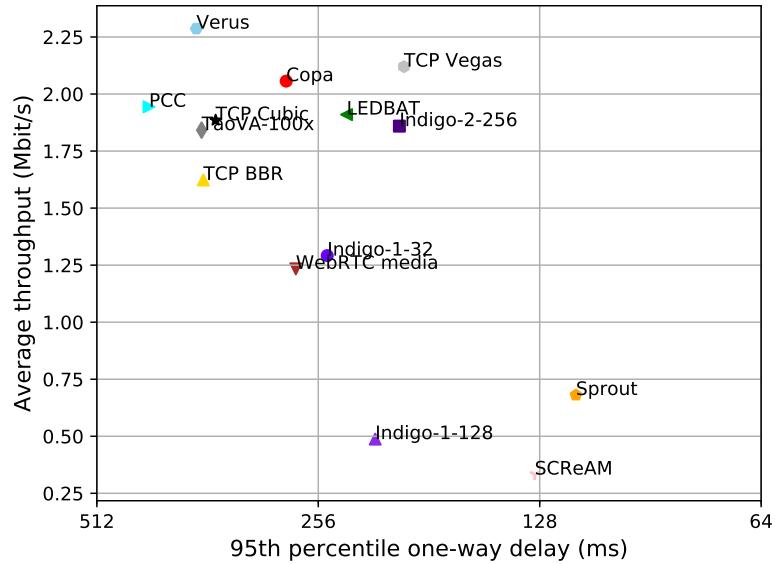
Pantheon Report

Generated at 2018-01-25 20:12:55 (UTC).
Data path: India ppp0 (*remote*) → AWS India 1 Ethernet (*local*).
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.

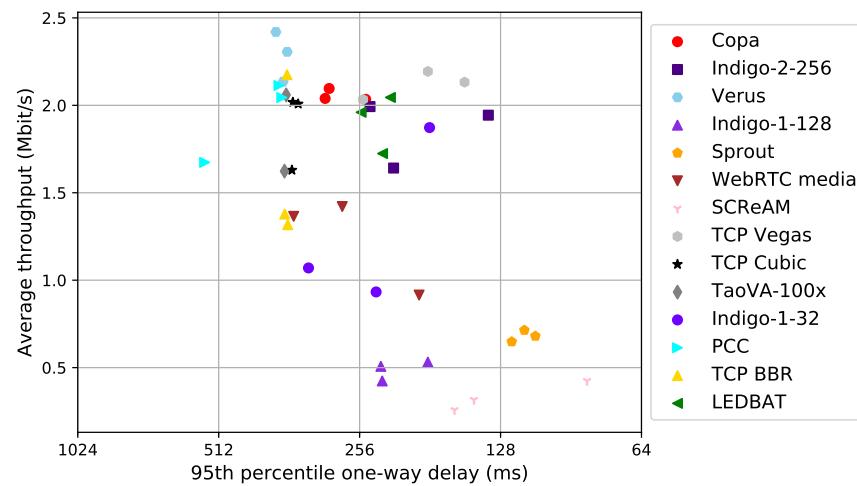
Git summary:

```
branch: master @ f23294ec38436c9f802847d477a41b7343ec76e6
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ a9b2060d39e4da2e8987e893e3eca2a6c7cd0ab9
third_party/indigo-1-layer-128-unit @ 3ae9e4ef4230db7484501f82ce8b377695f2f66d
third_party/indigo-1-layer-32-unit @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/indigo-1-layer-32-unit-no-calib @ 1f3a7f75b41135ed5b540c0fd3505939528e2a5f
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179aab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bf7e749737437f61b1eaeeb30b267cde681
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 India ppp0 to AWS India 1 Ethernet, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



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



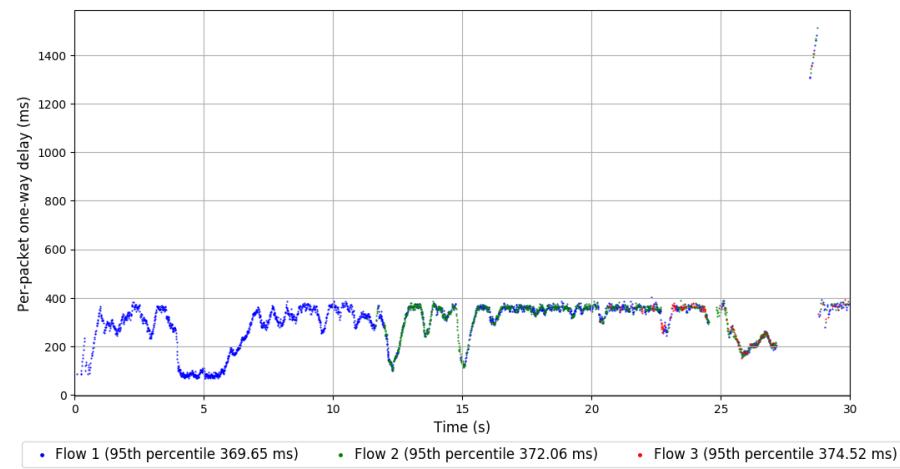
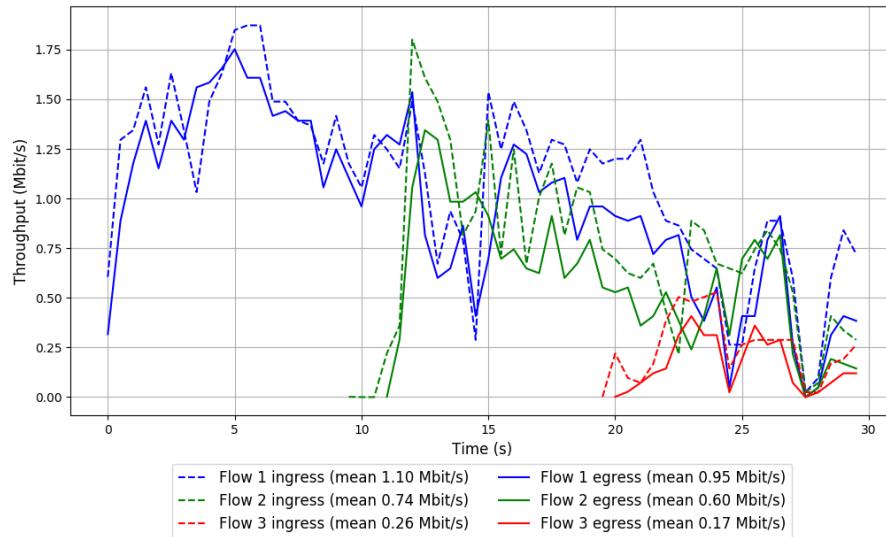
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.93	0.65	0.84	366.22	367.35	370.00	13.04	18.47	23.02
TCP Cubic		1.09	0.96	0.50	352.50	354.46	359.29	2.75	4.46	9.05
LEDBAT		1.11	0.89	0.64	227.94	244.52	233.24	2.14	2.40	4.83
PCC		1.21	0.87	0.51	373.07	589.51	773.87	48.16	72.36	91.58
QUIC Cubic		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SCReAM		0.16	0.18	0.18	131.39	123.56	117.66	0.56	0.96	2.02
WebRTC media		0.60	0.40	0.25	310.72	243.51	256.92	1.68	1.41	1.62
Sprout		0.34	0.34	0.34	114.89	111.97	120.16	0.81	0.79	1.92
TaoVA-100x		1.14	0.89	0.52	365.65	377.52	375.52	15.00	29.06	52.21
TCP Vegas		1.12	0.99	1.04	194.42	192.51	201.34	1.02	0.85	2.80
Verus		1.69	0.69	0.46	369.75	393.76	390.58	42.50	65.97	58.22
Copa		1.27	0.95	0.63	259.07	290.96	319.77	0.62	1.10	3.59
Indigo-2-256		0.80	0.93	1.37	195.20	206.28	191.13	2.35	2.32	2.20
Indigo-1-32		0.68	0.55	0.82	240.59	237.05	251.98	2.28	4.86	17.06
Indigo-1-128		0.22	0.26	0.30	222.72	186.84	255.77	10.37	8.45	22.99

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-25 18:34:43
End at: 2018-01-25 18:35:13
Local clock offset: 1.219 ms
Remote clock offset: -15.593 ms

# Below is generated by plot.py at 2018-01-25 20:12:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 369.958 ms
Loss rate: 17.75%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 369.646 ms
Loss rate: 13.43%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 372.059 ms
Loss rate: 23.93%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 374.523 ms
Loss rate: 37.46%
```

Run 1: Report of TCP BBR — Data Link

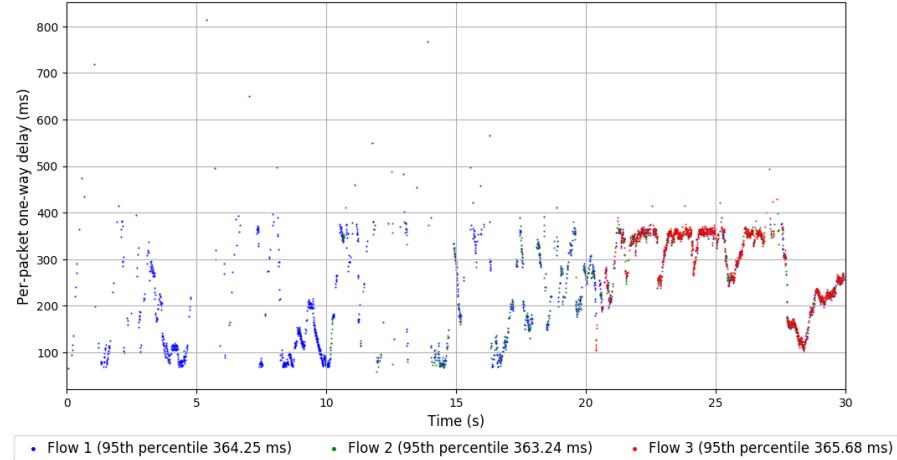
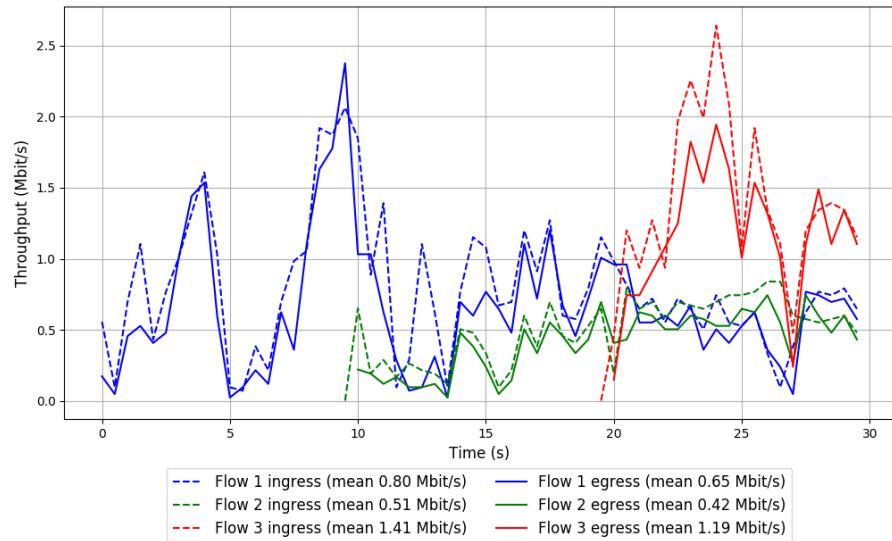


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-25 18:52:18
End at: 2018-01-25 18:52:48
Local clock offset: 1.02 ms
Remote clock offset: -17.336 ms

# Below is generated by plot.py at 2018-01-25 20:12:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 364.657 ms
Loss rate: 18.15%
-- Flow 1:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 364.250 ms
Loss rate: 18.19%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 363.243 ms
Loss rate: 18.37%
-- Flow 3:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 365.675 ms
Loss rate: 17.93%
```

Run 2: Report of TCP BBR — Data Link

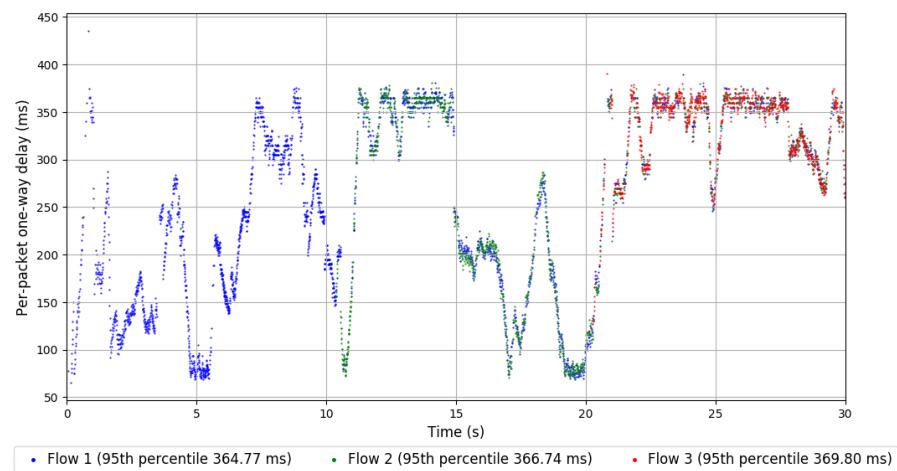
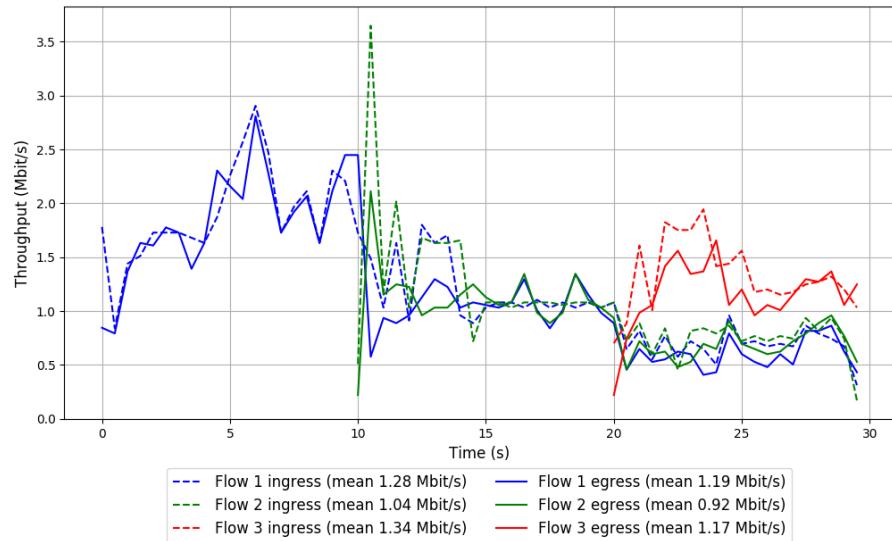


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-25 19:09:55
End at: 2018-01-25 19:10:25
Local clock offset: 2.544 ms
Remote clock offset: -16.35 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.17 Mbit/s
95th percentile per-packet one-way delay: 365.923 ms
Loss rate: 10.24%
-- Flow 1:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 364.768 ms
Loss rate: 7.49%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 366.737 ms
Loss rate: 13.10%
-- Flow 3:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 369.799 ms
Loss rate: 13.68%
```

Run 3: Report of TCP BBR — Data Link

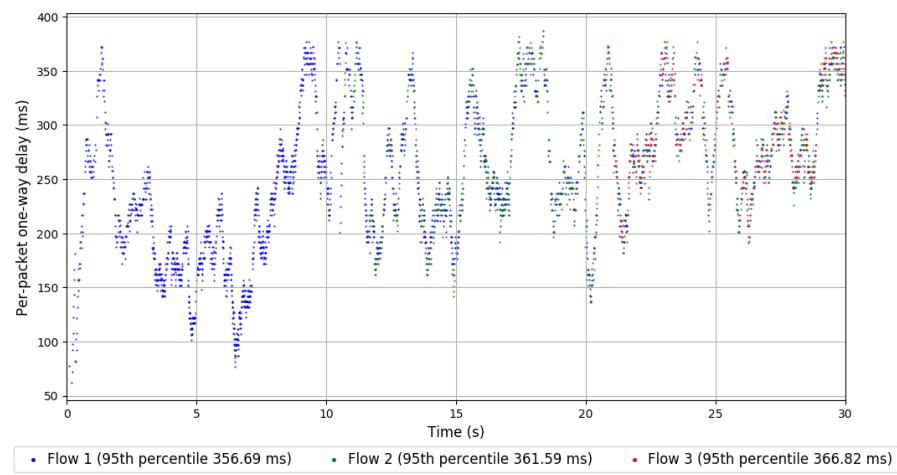
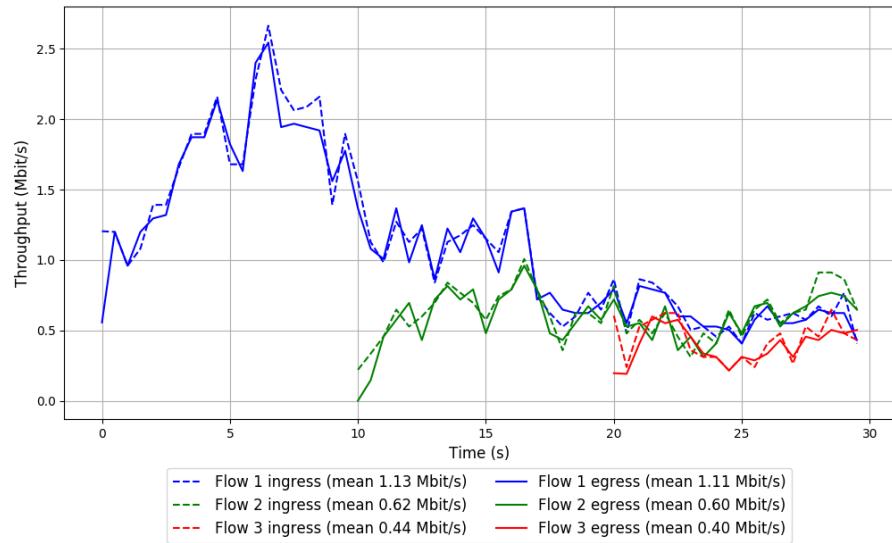


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-01-25 18:33:37
End at: 2018-01-25 18:34:07
Local clock offset: 2.22 ms
Remote clock offset: -16.763 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 357.184 ms
Loss rate: 3.70%
-- Flow 1:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 356.692 ms
Loss rate: 2.55%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 361.593 ms
Loss rate: 5.14%
-- Flow 3:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 366.820 ms
Loss rate: 8.61%
```

Run 1: Report of TCP Cubic — Data Link

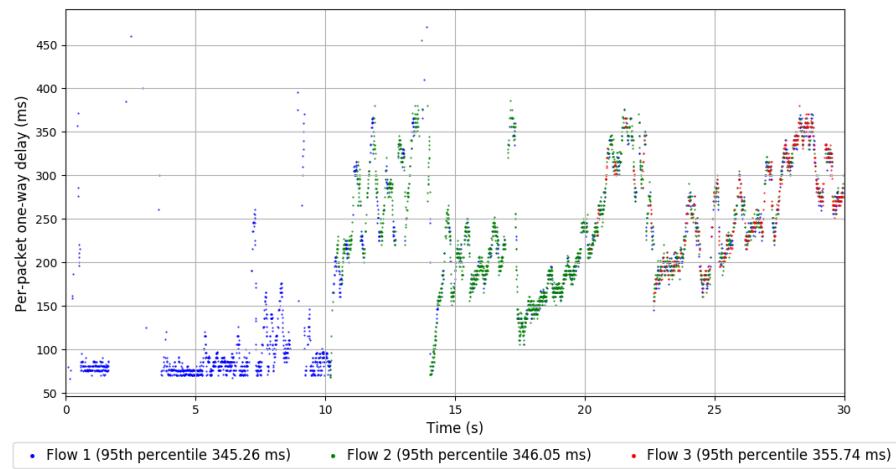
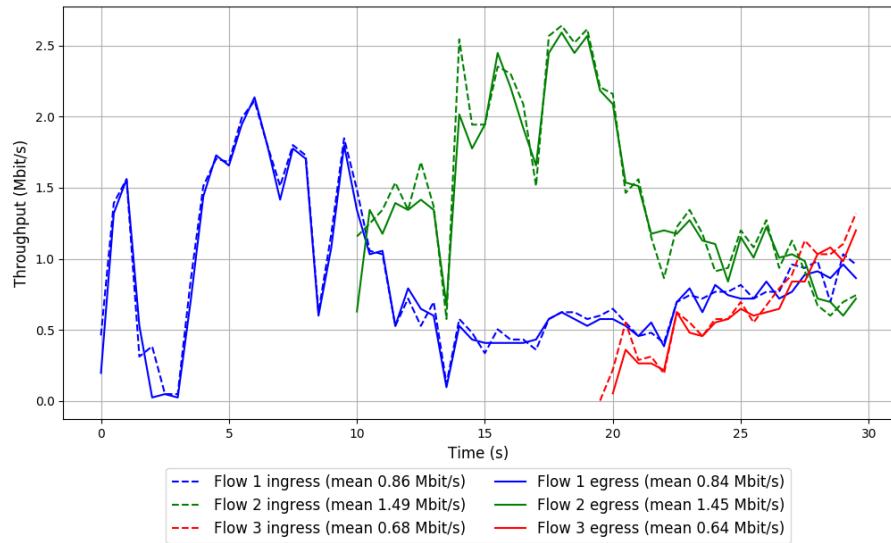


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-25 18:51:12
End at: 2018-01-25 18:51:42
Local clock offset: 4.25 ms
Remote clock offset: -14.849 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.01 Mbit/s
95th percentile per-packet one-way delay: 346.311 ms
Loss rate: 3.88%
-- Flow 1:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 345.263 ms
Loss rate: 3.48%
-- Flow 2:
Average throughput: 1.45 Mbit/s
95th percentile per-packet one-way delay: 346.053 ms
Loss rate: 3.06%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 355.737 ms
Loss rate: 9.02%
```

Run 2: Report of TCP Cubic — Data Link

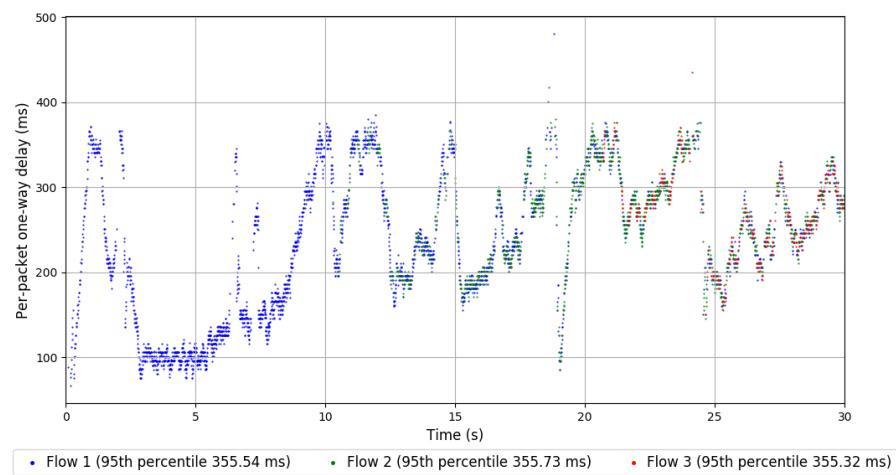
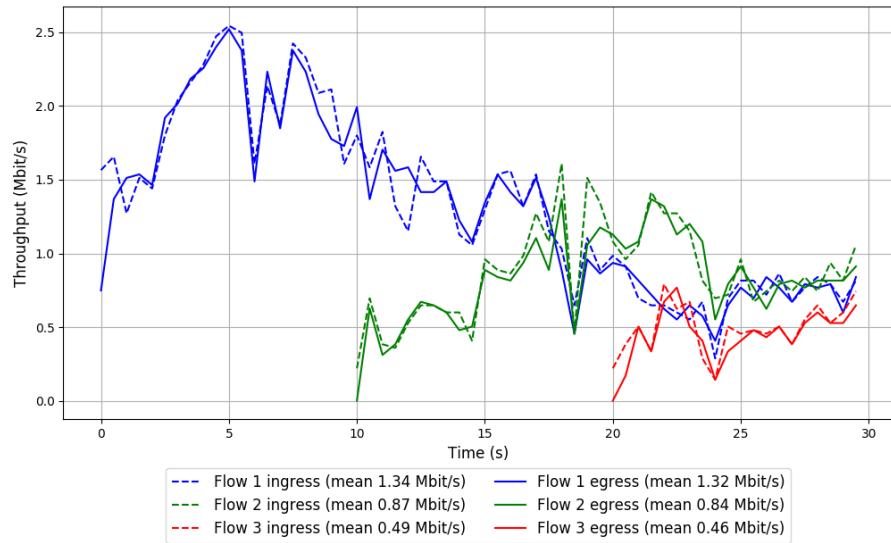


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-25 19:08:48
End at: 2018-01-25 19:09:18
Local clock offset: 3.83 ms
Remote clock offset: -15.807 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.02 Mbit/s
95th percentile per-packet one-way delay: 355.568 ms
Loss rate: 3.61%
-- Flow 1:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 355.537 ms
Loss rate: 2.21%
-- Flow 2:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 355.732 ms
Loss rate: 5.17%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 355.325 ms
Loss rate: 9.53%
```

Run 3: Report of TCP Cubic — Data Link

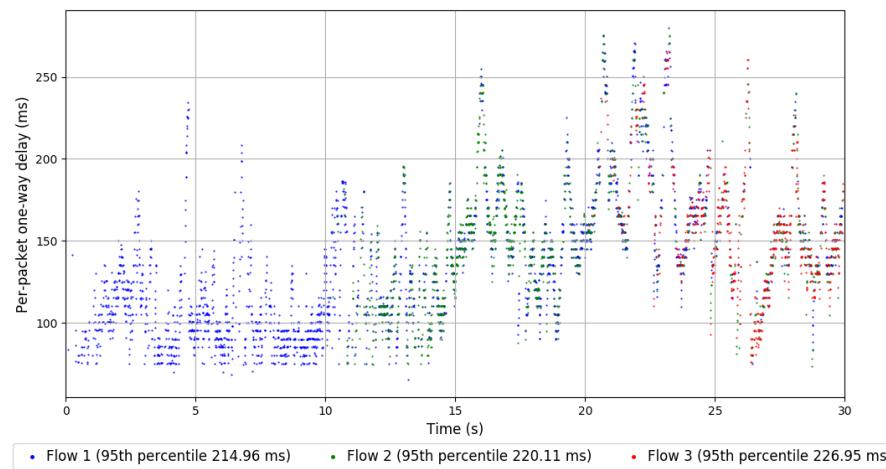
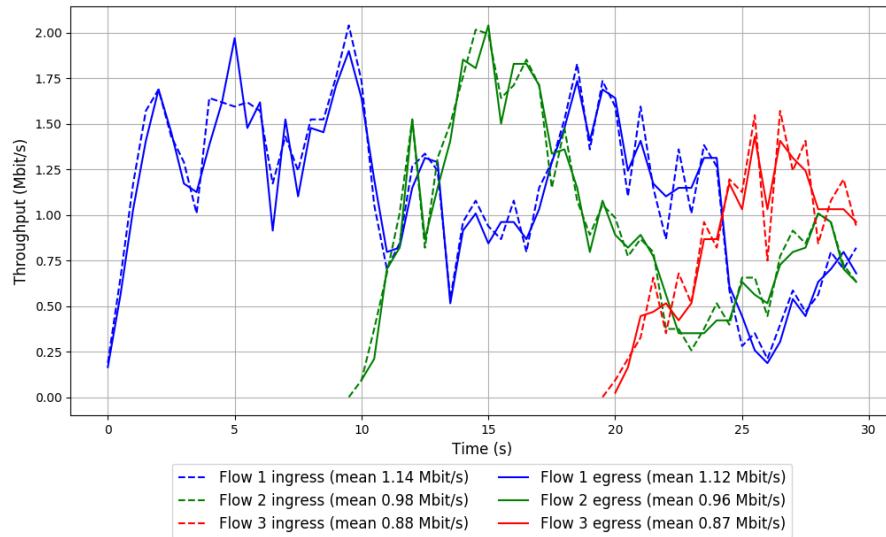


```
Run 1: Statistics of LEDBAT

Start at: 2018-01-25 18:27:01
End at: 2018-01-25 18:27:31
Local clock offset: 3.683 ms
Remote clock offset: -17.211 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.05 Mbit/s
95th percentile per-packet one-way delay: 220.071 ms
Loss rate: 2.14%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 214.956 ms
Loss rate: 2.06%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 220.109 ms
Loss rate: 1.86%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 226.947 ms
Loss rate: 3.08%
```

Run 1: Report of LEDBAT — Data Link

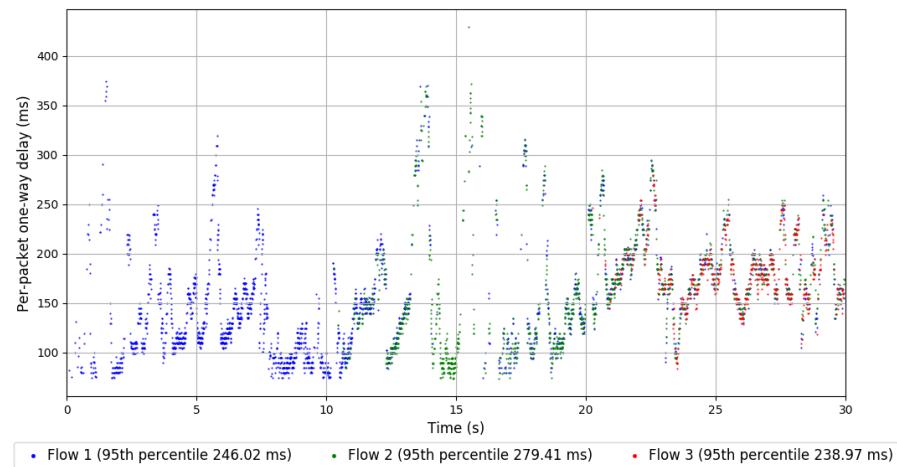
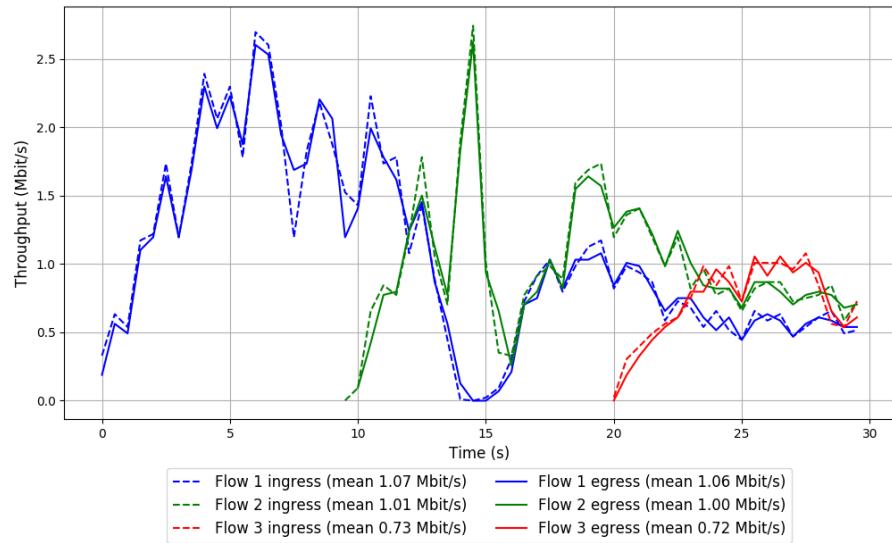


Run 2: Statistics of LEDBAT

```
Start at: 2018-01-25 18:44:36
End at: 2018-01-25 18:45:06
Local clock offset: 4.084 ms
Remote clock offset: -16.299 ms

# Below is generated by plot.py at 2018-01-25 20:12:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.96 Mbit/s
95th percentile per-packet one-way delay: 254.128 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 1.06 Mbit/s
95th percentile per-packet one-way delay: 246.019 ms
Loss rate: 1.28%
-- Flow 2:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 279.414 ms
Loss rate: 1.45%
-- Flow 3:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 238.971 ms
Loss rate: 3.09%
```

Run 2: Report of LEDBAT — Data Link

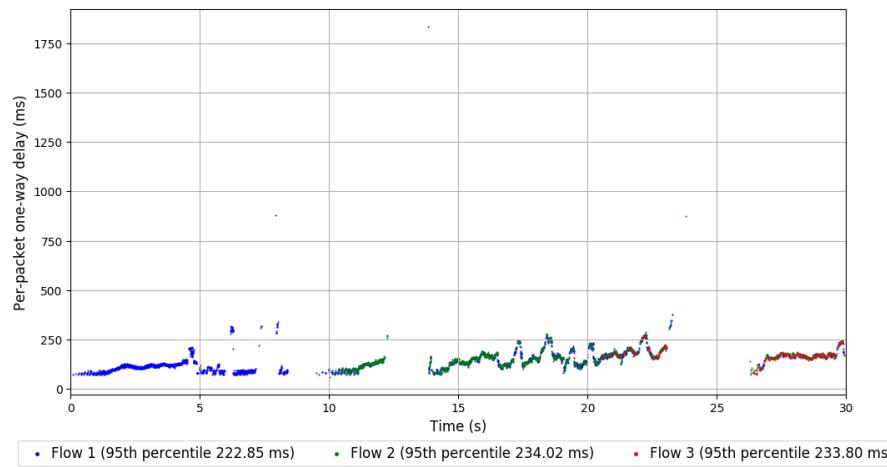
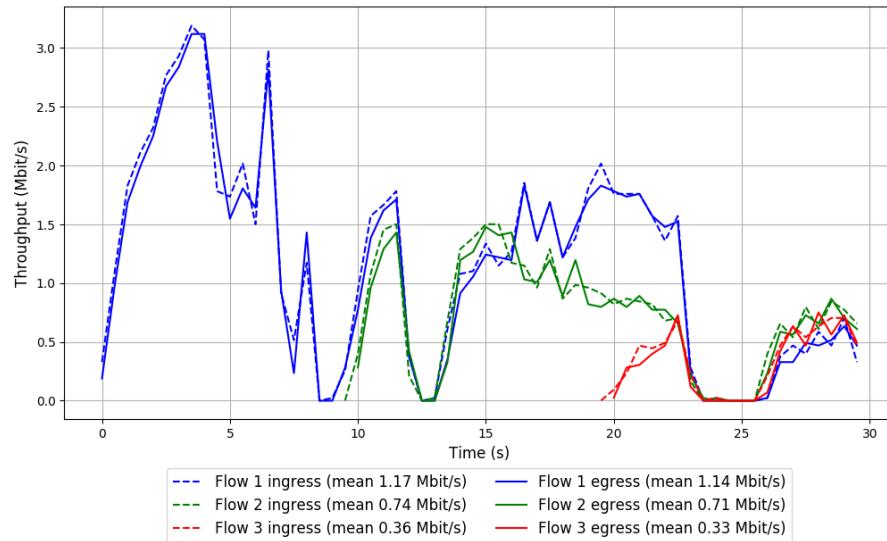


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-25 19:02:12
End at: 2018-01-25 19:02:42
Local clock offset: 3.88 ms
Remote clock offset: -16.701 ms

# Below is generated by plot.py at 2018-01-25 20:12:25
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.72 Mbit/s
95th percentile per-packet one-way delay: 228.683 ms
Loss rate: 3.65%
-- Flow 1:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 222.846 ms
Loss rate: 3.07%
-- Flow 2:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 234.023 ms
Loss rate: 3.89%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 233.801 ms
Loss rate: 8.33%
```

Run 3: Report of LEDBAT — Data Link

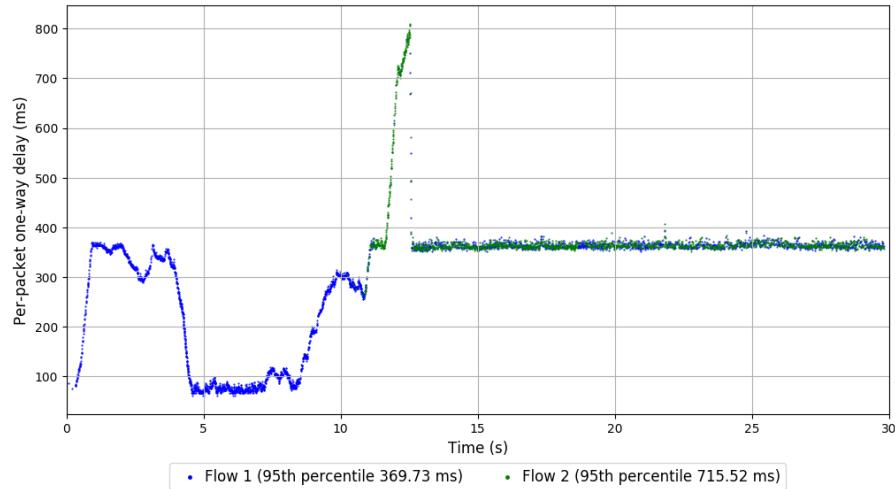
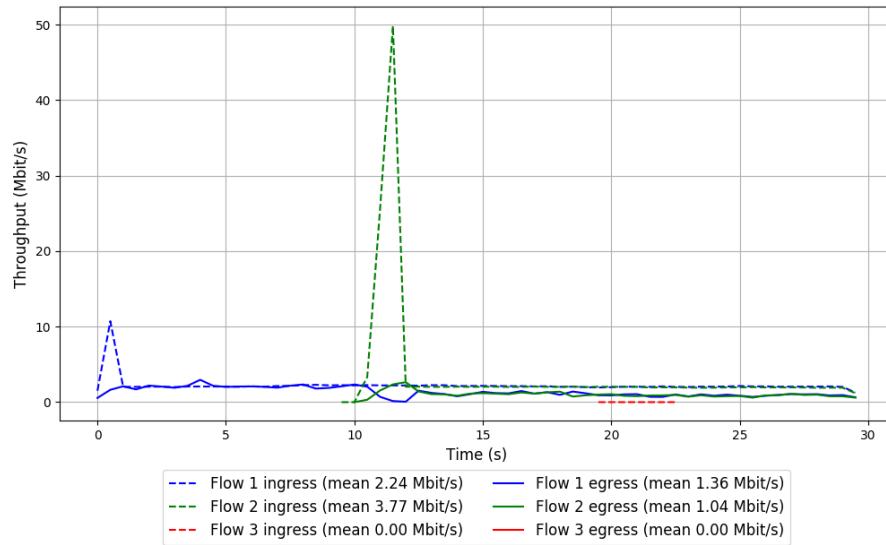


Run 1: Statistics of PCC

```
Start at: 2018-01-25 18:41:19
End at: 2018-01-25 18:41:49
Local clock offset: 0.879 ms
Remote clock offset: -14.406 ms

# Below is generated by plot.py at 2018-01-25 20:12:29
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 375.406 ms
Loss rate: 57.07%
-- Flow 1:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 369.728 ms
Loss rate: 39.31%
-- Flow 2:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 715.519 ms
Loss rate: 72.89%
-- Flow 3:
Average throughput: 0.00 Mbit/s
```

Run 1: Report of PCC — Data Link

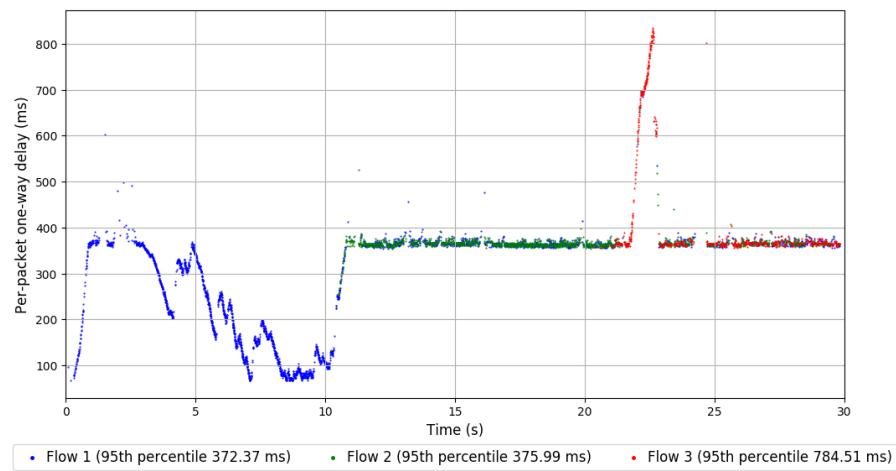
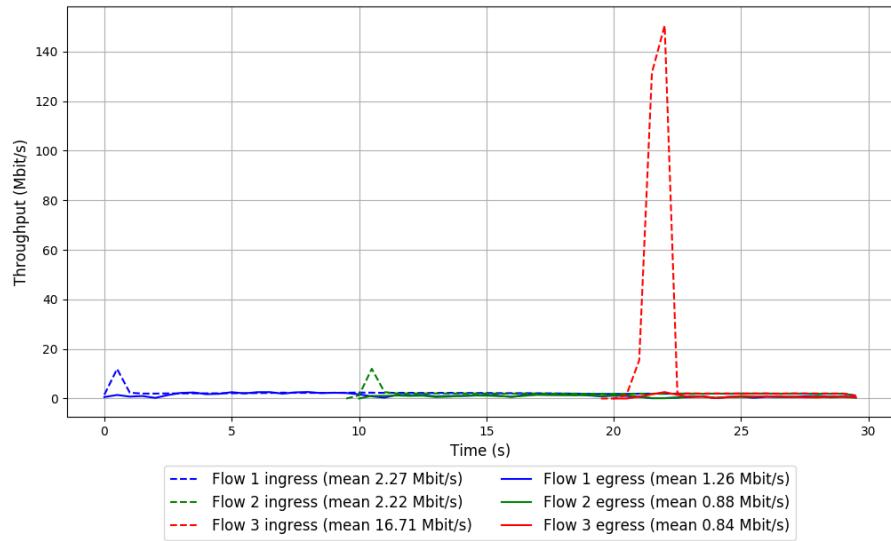


Run 2: Statistics of PCC

```
Start at: 2018-01-25 18:58:54
End at: 2018-01-25 18:59:24
Local clock offset: 2.623 ms
Remote clock offset: -16.57 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.11 Mbit/s
95th percentile per-packet one-way delay: 380.695 ms
Loss rate: 77.26%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 372.367 ms
Loss rate: 44.72%
-- Flow 2:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 375.988 ms
Loss rate: 60.50%
-- Flow 3:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 784.513 ms
Loss rate: 95.14%
```

Run 2: Report of PCC — Data Link

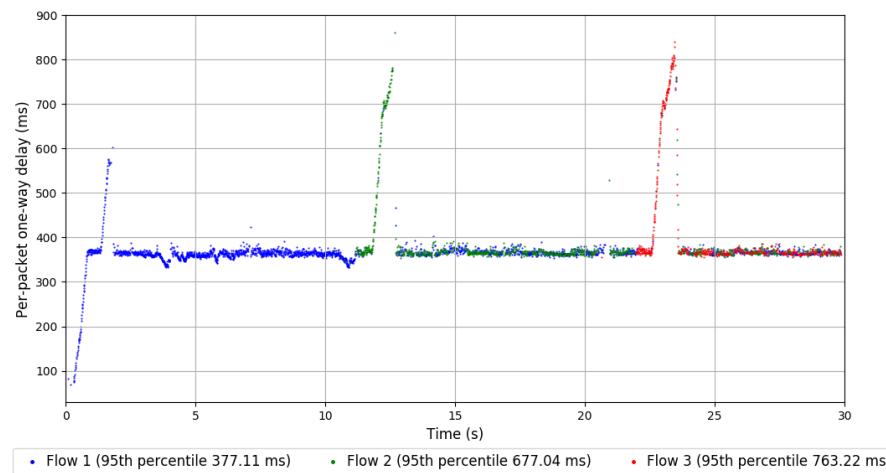
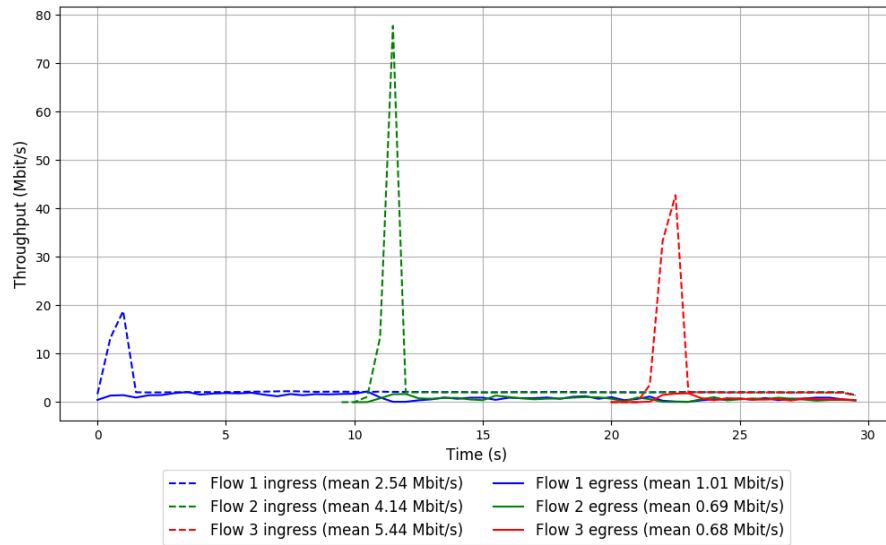


Run 3: Statistics of PCC

```
Start at: 2018-01-25 19:16:31
End at: 2018-01-25 19:17:01
Local clock offset: 0.909 ms
Remote clock offset: -17.042 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.67 Mbit/s
95th percentile per-packet one-way delay: 548.631 ms
Loss rate: 76.46%
-- Flow 1:
Average throughput: 1.01 Mbit/s
95th percentile per-packet one-way delay: 377.110 ms
Loss rate: 60.44%
-- Flow 2:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 677.038 ms
Loss rate: 83.69%
-- Flow 3:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 763.221 ms
Loss rate: 88.02%
```

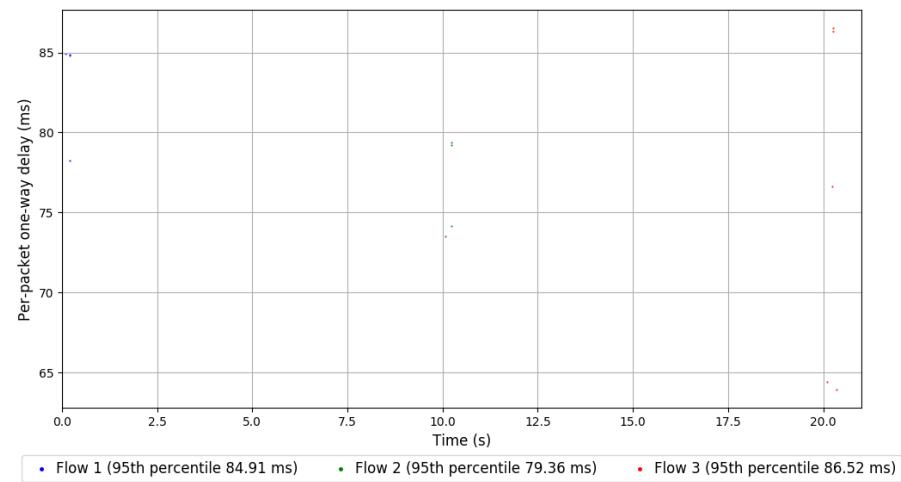
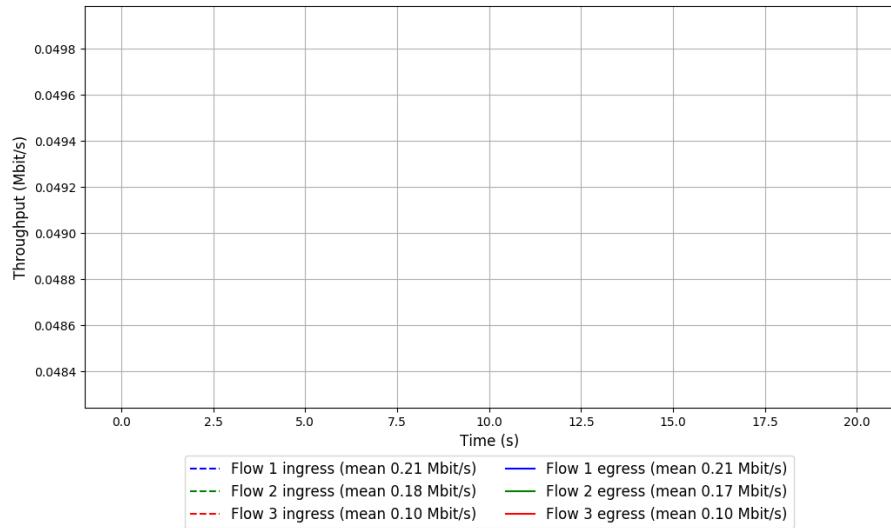
Run 3: Report of PCC — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-01-25 18:43:30
End at: 2018-01-25 18:44:00
Local clock offset: 3.649 ms
Remote clock offset: -16.159 ms

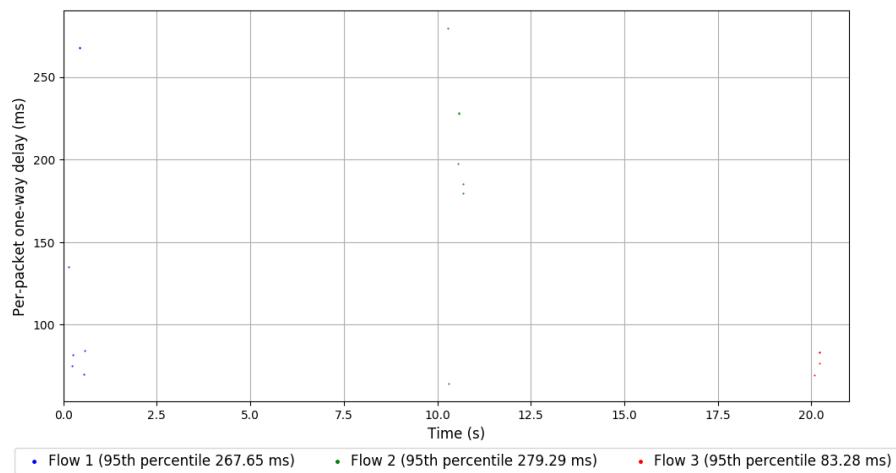
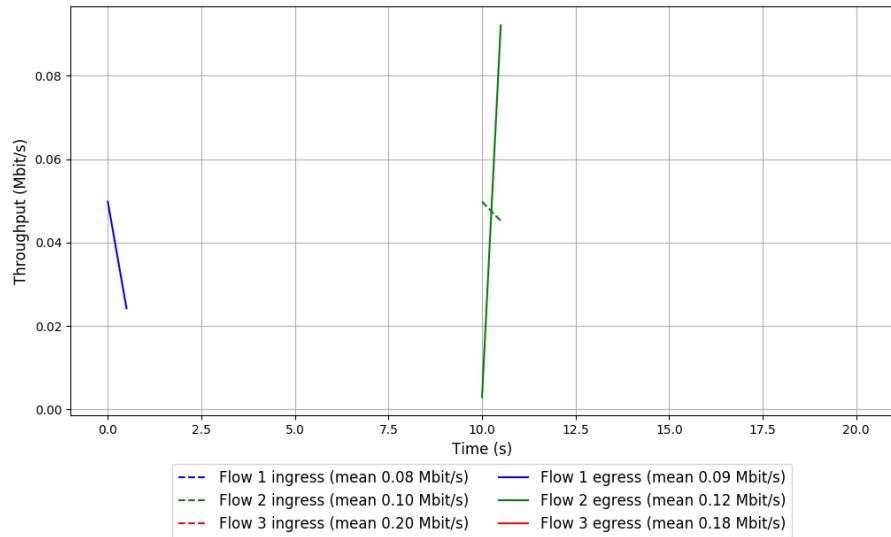
Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2018-01-25 19:01:06
End at: 2018-01-25 19:01:36
Local clock offset: 3.832 ms
Remote clock offset: -18.228 ms

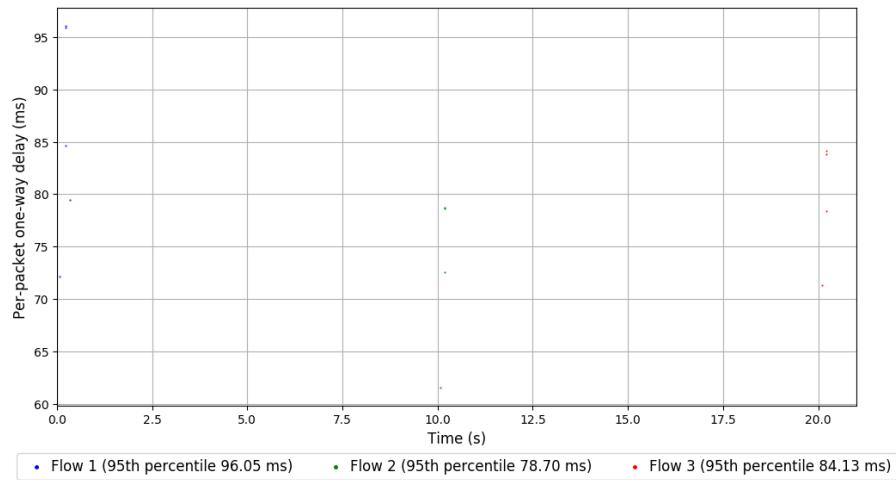
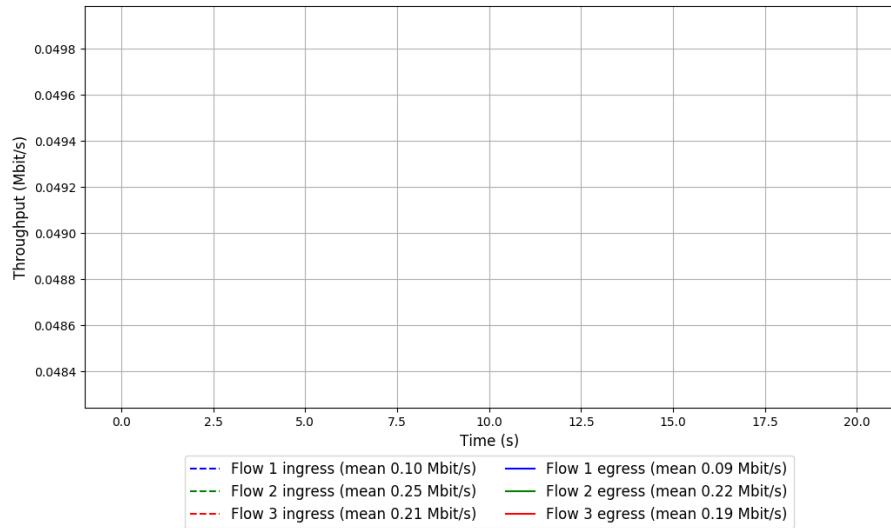
Run 2: Report of QUIC Cubic — Data Link



Run 3: Statistics of QUIC Cubic

Start at: 2018-01-25 19:18:43
End at: 2018-01-25 19:19:13
Local clock offset: 2.161 ms
Remote clock offset: -16.458 ms

Run 3: Report of QUIC Cubic — Data Link

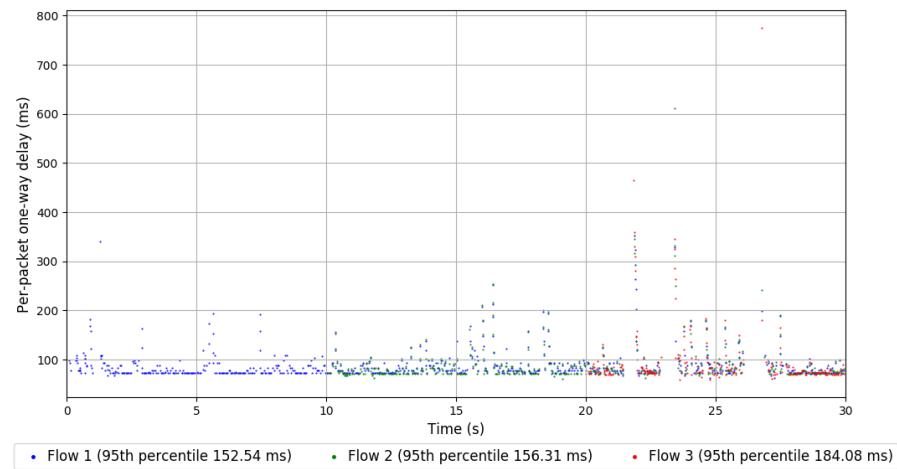
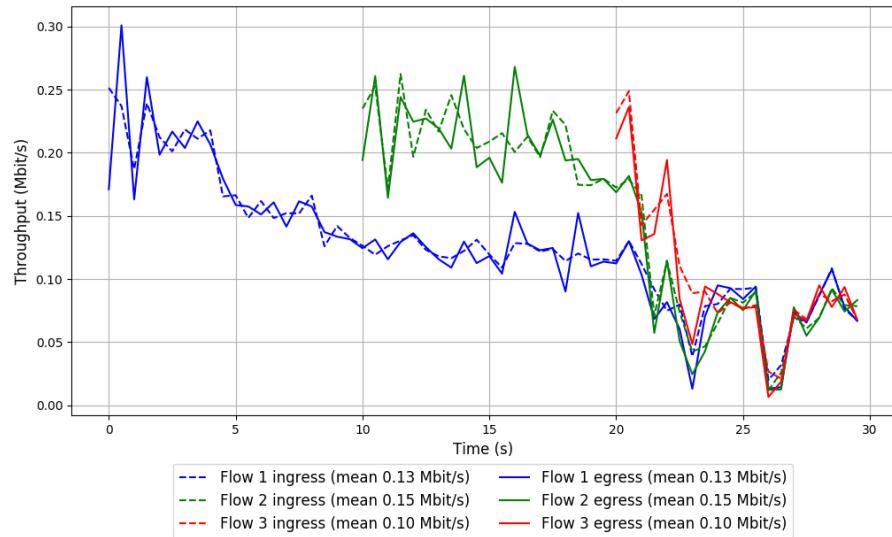


```
Run 1: Statistics of SCReAM
```

```
Start at: 2018-01-25 18:29:13
End at: 2018-01-25 18:29:43
Local clock offset: 2.063 ms
Remote clock offset: -17.207 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 160.521 ms
Loss rate: 2.15%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 152.545 ms
Loss rate: 1.42%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 156.309 ms
Loss rate: 2.09%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 184.081 ms
Loss rate: 5.07%
```

Run 1: Report of SCReAM — Data Link

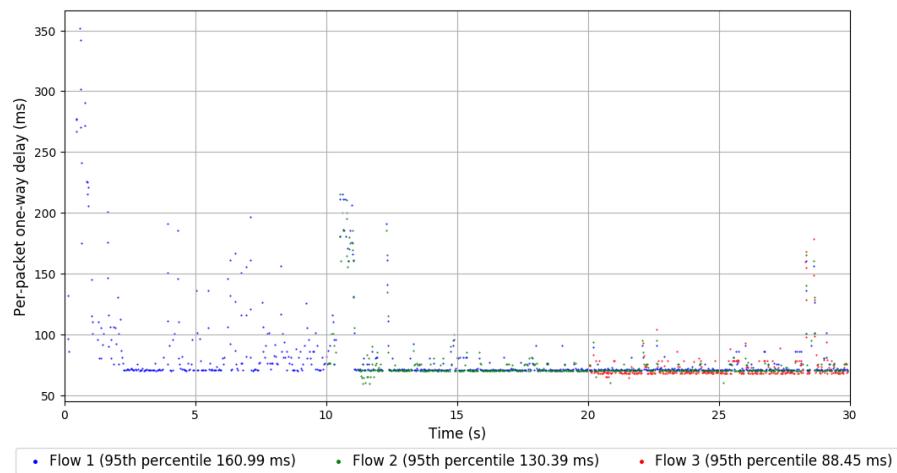
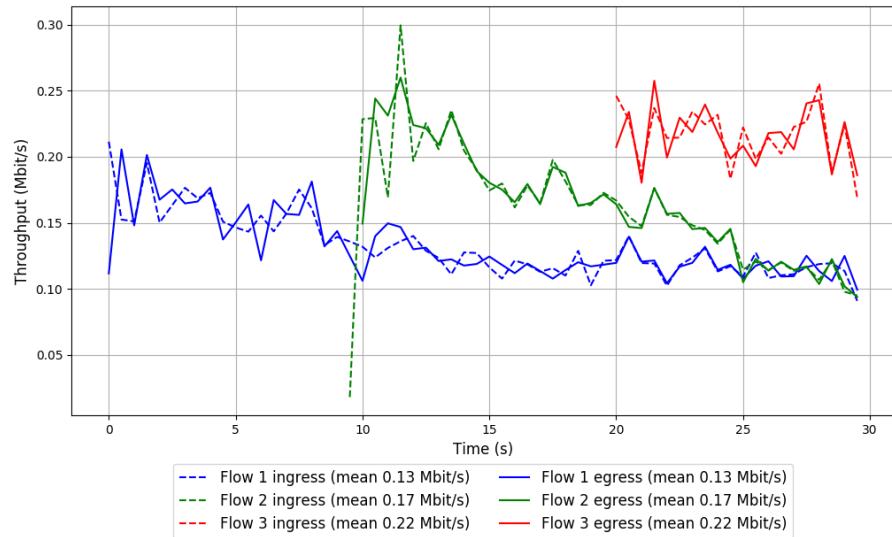


Run 2: Statistics of SCReAM

```
Start at: 2018-01-25 18:46:49
End at: 2018-01-25 18:47:19
Local clock offset: 3.059 ms
Remote clock offset: -14.645 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 145.883 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 160.990 ms
Loss rate: 0.12%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 130.390 ms
Loss rate: 0.60%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 88.454 ms
Loss rate: 0.36%
```

Run 2: Report of SCReAM — Data Link

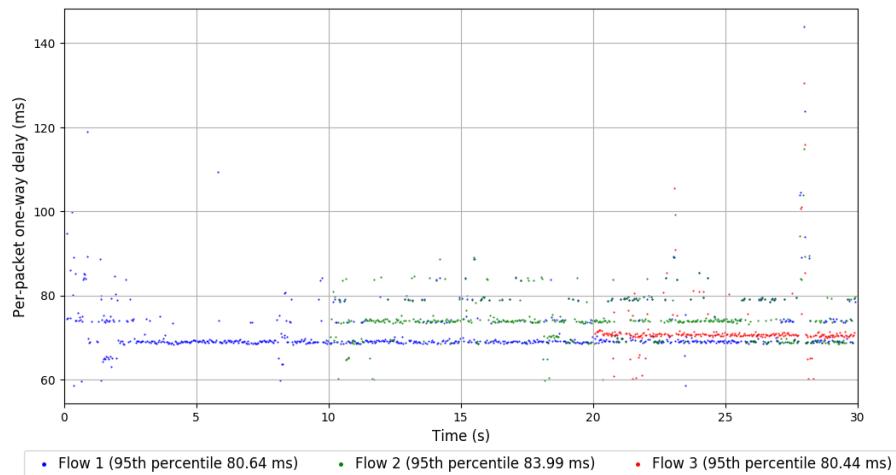
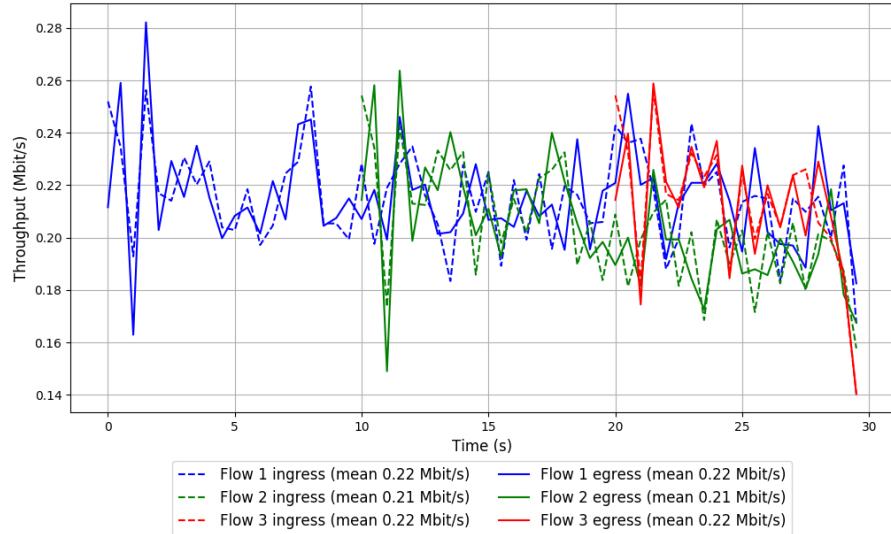


Run 3: Statistics of SCReAM

```
Start at: 2018-01-25 19:04:23
End at: 2018-01-25 19:04:53
Local clock offset: 1.915 ms
Remote clock offset: -16.53 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 83.652 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 80.639 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 83.988 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 80.444 ms
Loss rate: 0.63%
```

Run 3: Report of SCReAM — Data Link

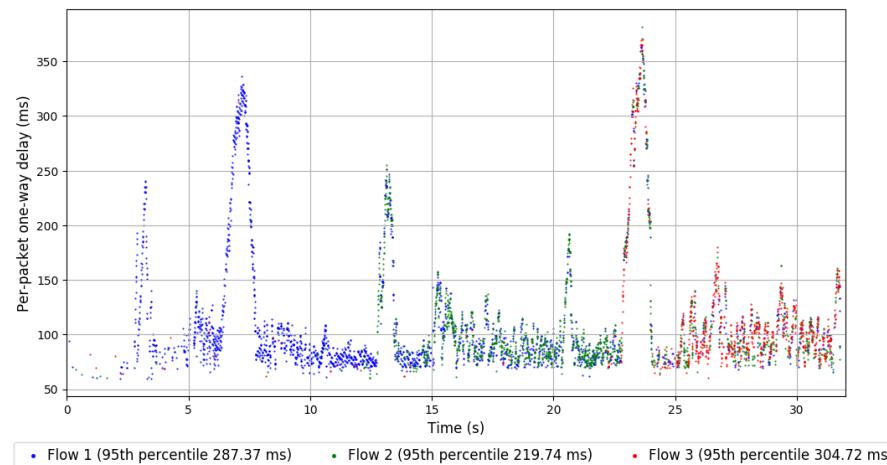
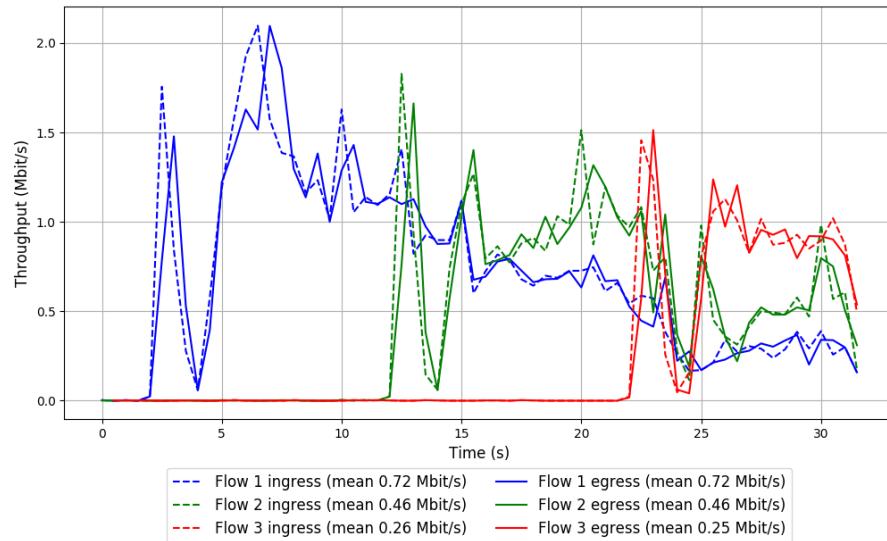


```
Run 1: Statistics of WebRTC media

Start at: 2018-01-25 18:40:13
End at: 2018-01-25 18:40:43
Local clock offset: 2.131 ms
Remote clock offset: -16.679 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.42 Mbit/s
95th percentile per-packet one-way delay: 278.799 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 287.371 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 219.739 ms
Loss rate: 0.75%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 304.722 ms
Loss rate: 2.36%
```

Run 1: Report of WebRTC media — Data Link

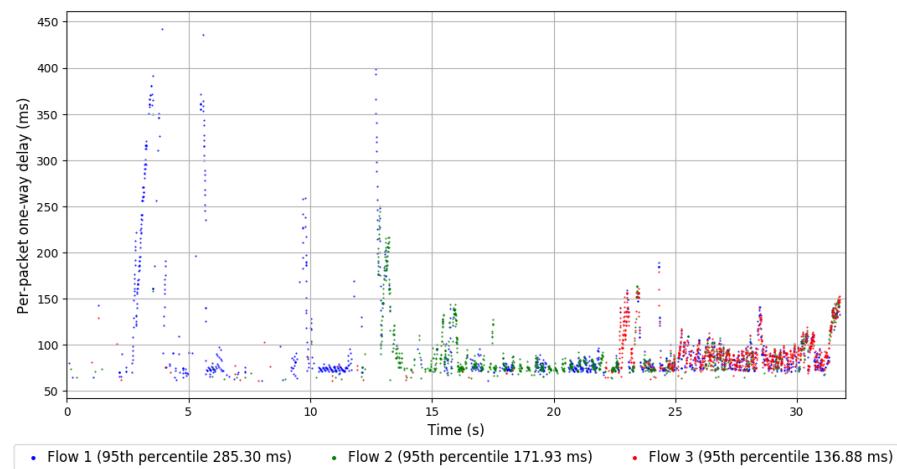
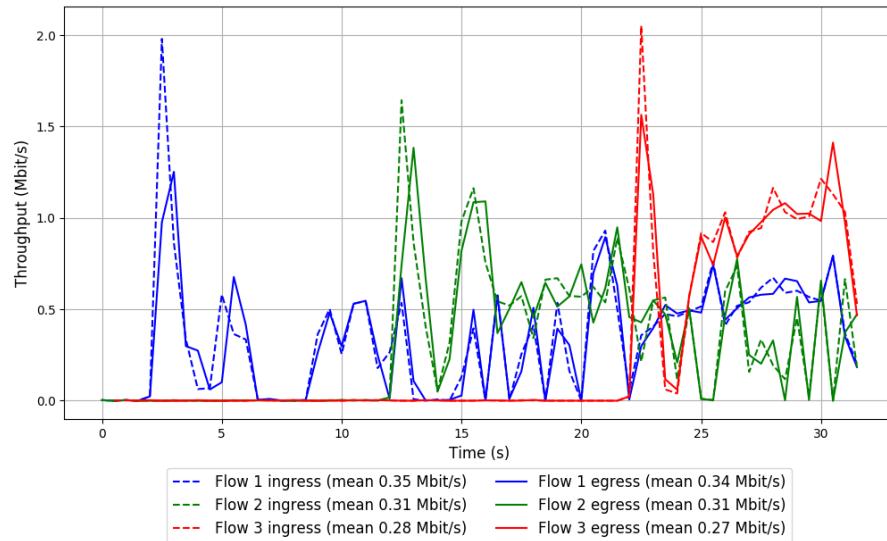


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-25 18:57:48
End at: 2018-01-25 18:58:18
Local clock offset: 3.523 ms
Remote clock offset: -18.3 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 191.036 ms
Loss rate: 1.96%
-- Flow 1:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 285.302 ms
Loss rate: 3.08%
-- Flow 2:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 171.932 ms
Loss rate: 0.64%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 136.881 ms
Loss rate: 1.97%
```

Run 2: Report of WebRTC media — Data Link

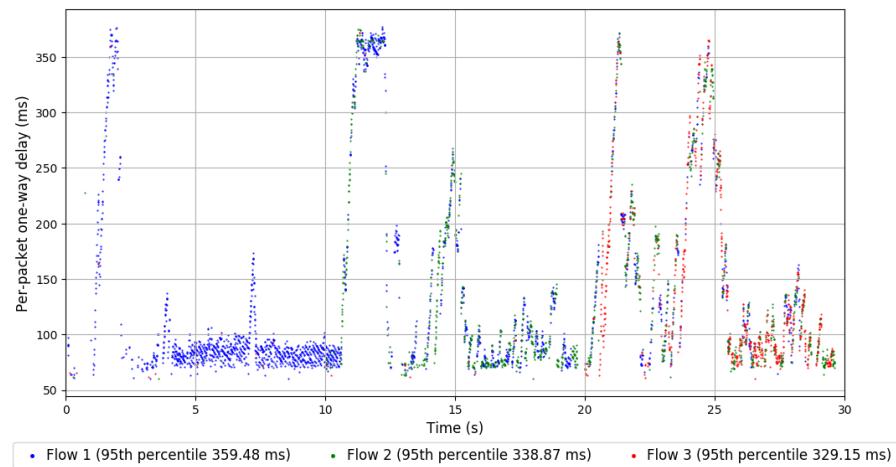
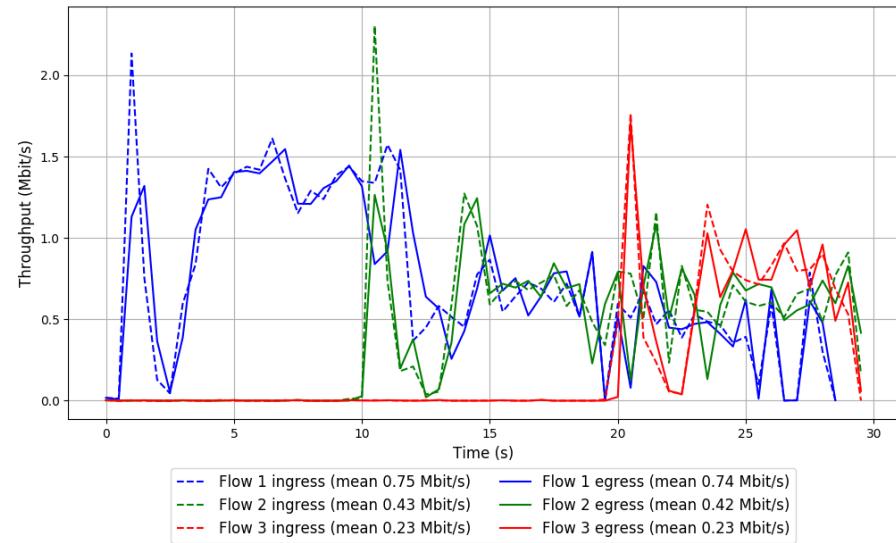


```
Run 3: Statistics of WebRTC media

Start at: 2018-01-25 19:15:26
End at: 2018-01-25 19:15:56
Local clock offset: 3.208 ms
Remote clock offset: -16.531 ms

# Below is generated by plot.py at 2018-01-25 20:12:34
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 354.157 ms
Loss rate: 1.81%
-- Flow 1:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 359.476 ms
Loss rate: 1.59%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 338.871 ms
Loss rate: 2.85%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 329.148 ms
Loss rate: 0.54%
```

Run 3: Report of WebRTC media — Data Link

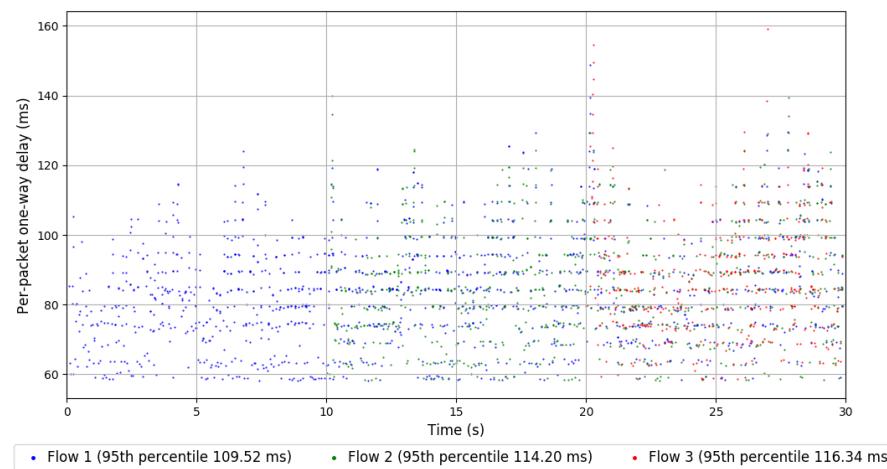
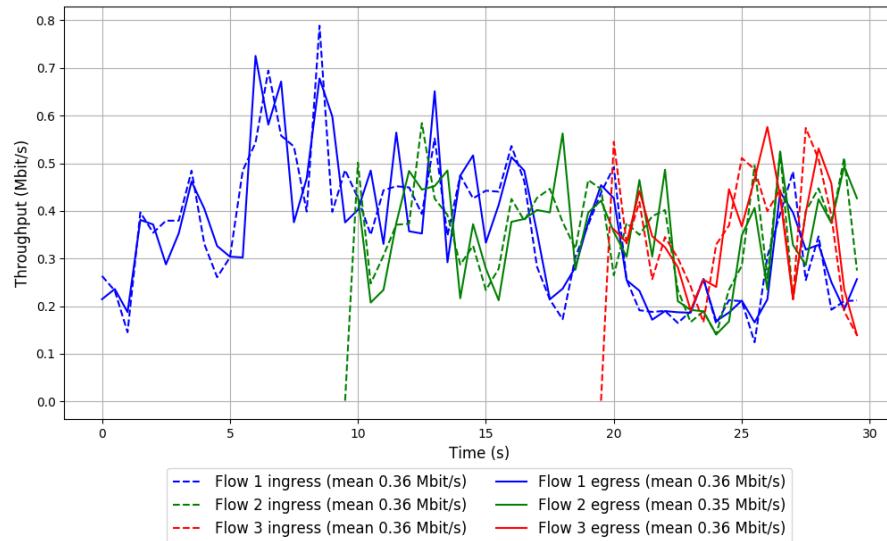


Run 1: Statistics of Sprout

```
Start at: 2018-01-25 18:38:01
End at: 2018-01-25 18:38:31
Local clock offset: 2.457 ms
Remote clock offset: -15.572 ms

# Below is generated by plot.py at 2018-01-25 20:12:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 113.841 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 109.519 ms
Loss rate: 0.01%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 114.200 ms
Loss rate: 0.52%
-- Flow 3:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 116.342 ms
Loss rate: 1.77%
```

Run 1: Report of Sprout — Data Link

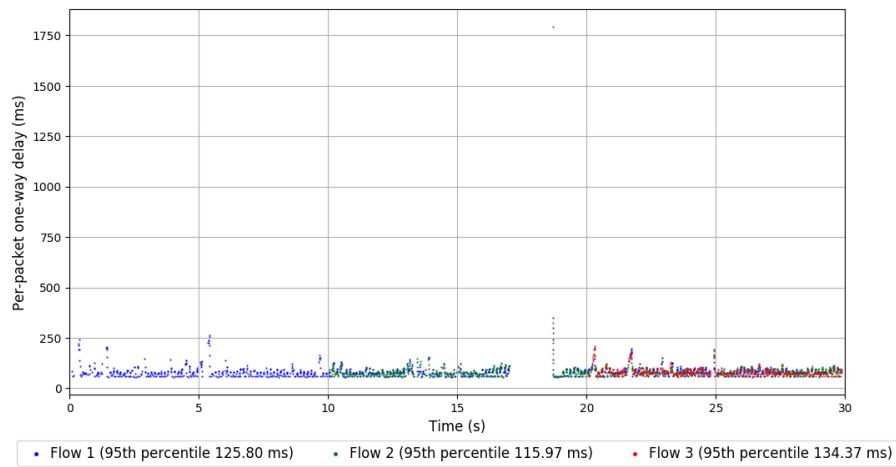
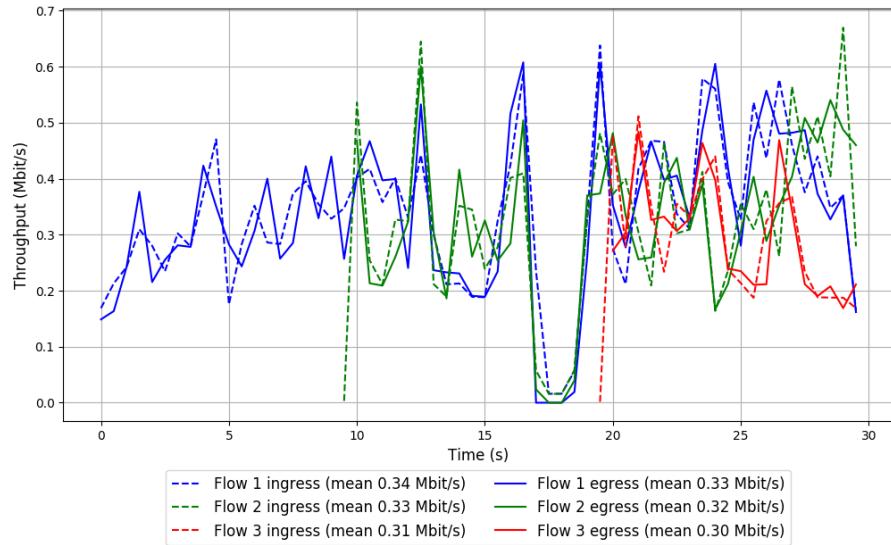


Run 2: Statistics of Sprout

```
Start at: 2018-01-25 18:55:36
End at: 2018-01-25 18:56:06
Local clock offset: 2.369 ms
Remote clock offset: -14.823 ms

# Below is generated by plot.py at 2018-01-25 20:12:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 121.163 ms
Loss rate: 1.61%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 125.798 ms
Loss rate: 1.77%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 115.965 ms
Loss rate: 1.22%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 134.368 ms
Loss rate: 1.94%
```

Run 2: Report of Sprout — Data Link

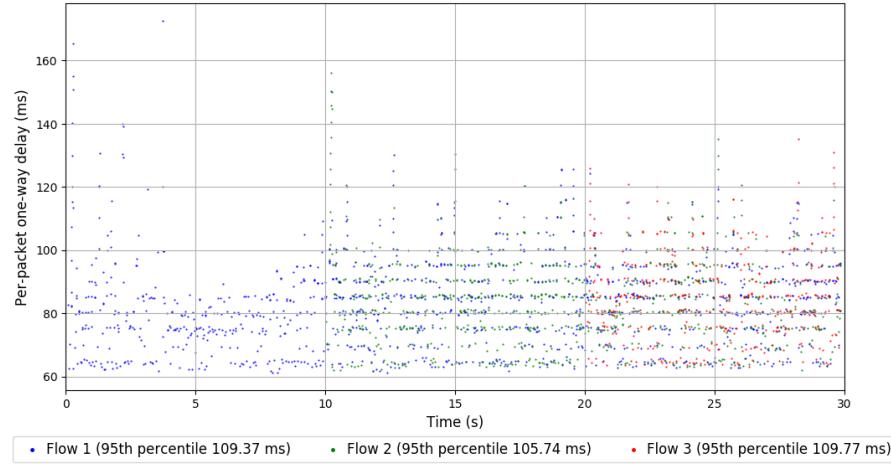
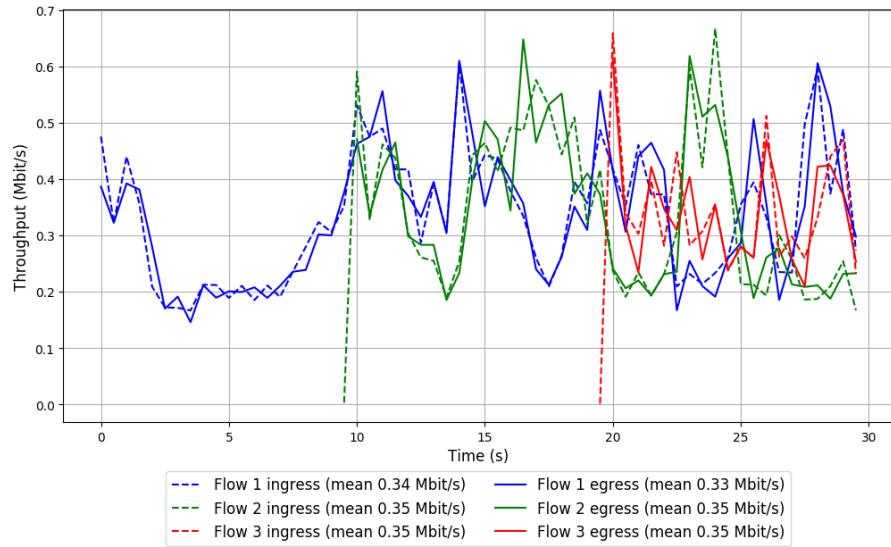


Run 3: Statistics of Sprout

```
Start at: 2018-01-25 19:13:14
End at: 2018-01-25 19:13:44
Local clock offset: 3.487 ms
Remote clock offset: -17.432 ms

# Below is generated by plot.py at 2018-01-25 20:12:35
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 107.863 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 109.366 ms
Loss rate: 0.66%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 105.740 ms
Loss rate: 0.62%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 109.765 ms
Loss rate: 2.04%
```

Run 3: Report of Sprout — Data Link

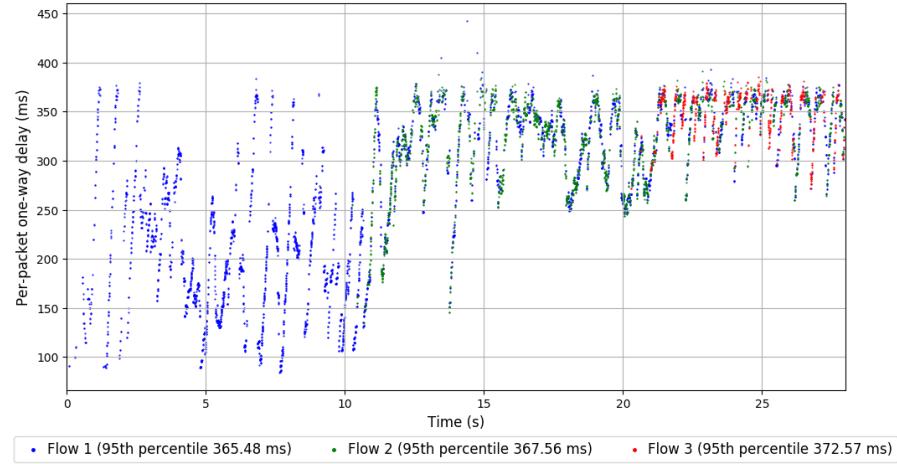
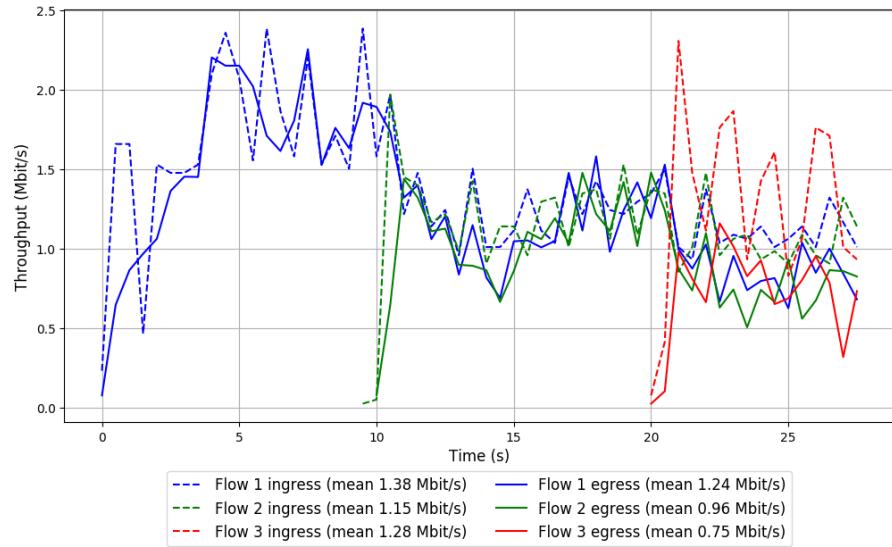


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-01-25 18:28:07
End at: 2018-01-25 18:28:37
Local clock offset: 3.711 ms
Remote clock offset: -16.468 ms

# Below is generated by plot.py at 2018-01-25 20:12:40
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.06 Mbit/s
95th percentile per-packet one-way delay: 367.347 ms
Loss rate: 17.23%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 365.479 ms
Loss rate: 10.05%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 367.557 ms
Loss rate: 17.69%
-- Flow 3:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 372.571 ms
Loss rate: 43.56%
```

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

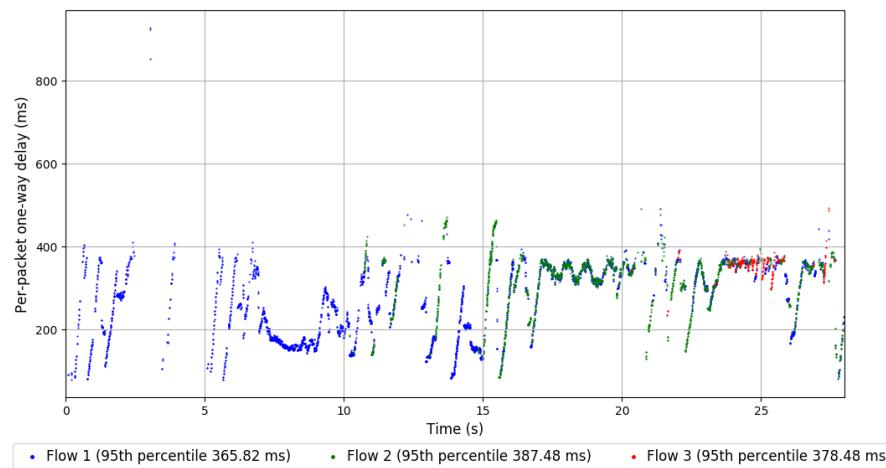
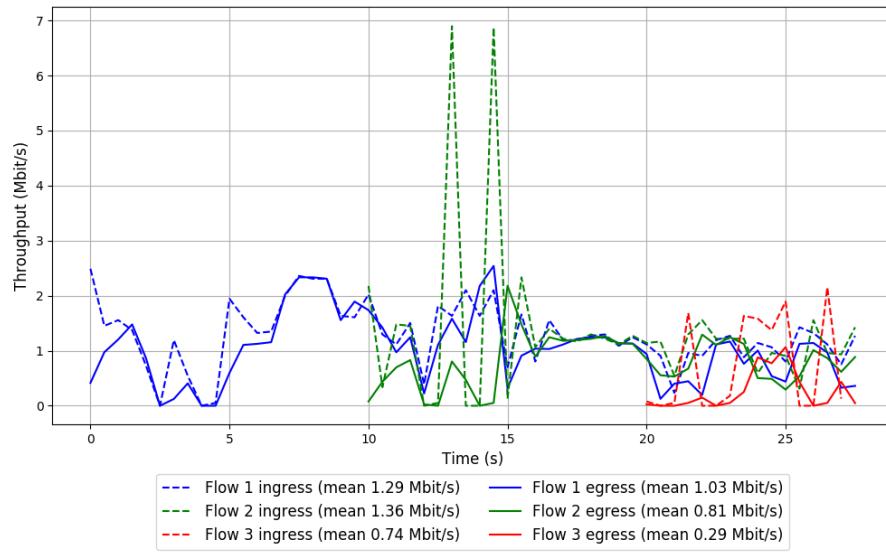


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-25 18:45:42
End at: 2018-01-25 18:46:12
Local clock offset: 4.656 ms
Remote clock offset: -15.616 ms

# Below is generated by plot.py at 2018-01-25 20:12:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 370.416 ms
Loss rate: 30.88%
-- Flow 1:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 365.825 ms
Loss rate: 19.94%
-- Flow 2:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 387.483 ms
Loss rate: 40.43%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 378.475 ms
Loss rate: 60.86%
```

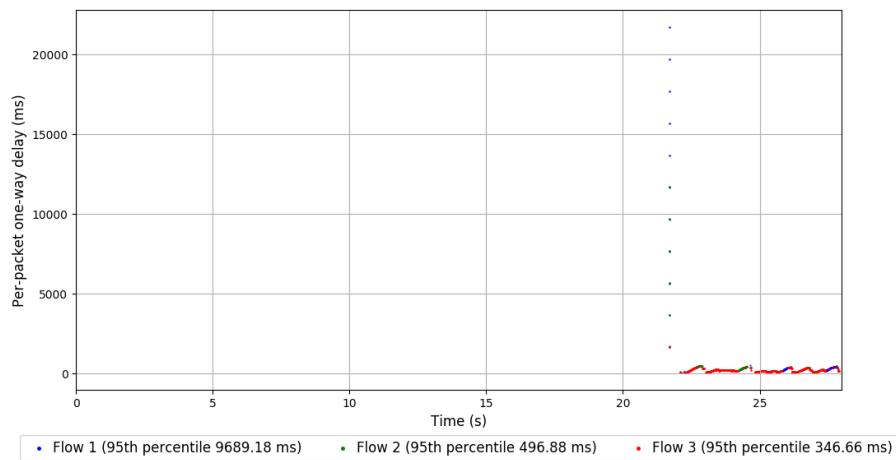
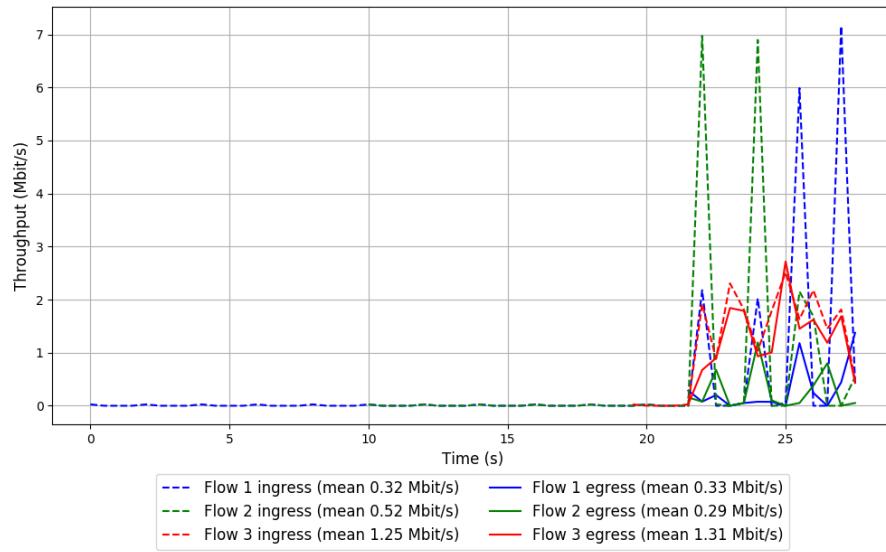
Run 2: Report of TaoVA-100x — Data Link



Run 3: Statistics of TaoVA-100x

Start at: 2018-01-25 19:03:18
End at: 2018-01-25 19:03:48
Local clock offset: 4.011 ms
Remote clock offset: -18.009 ms

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

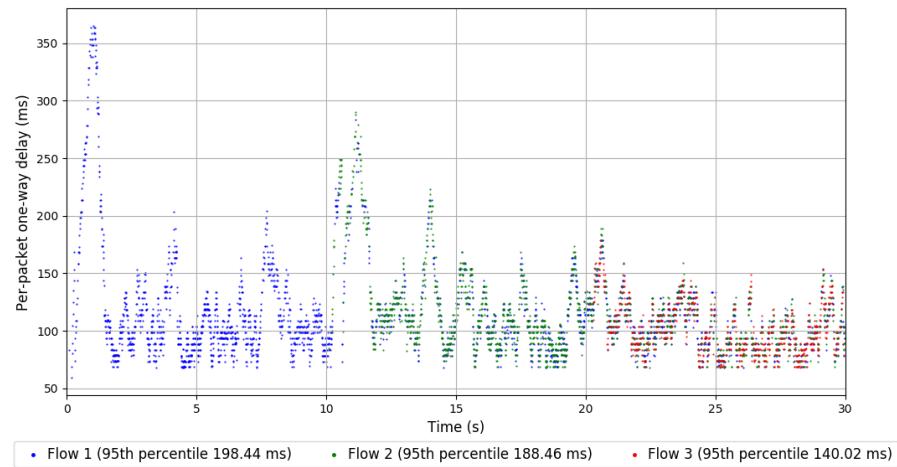
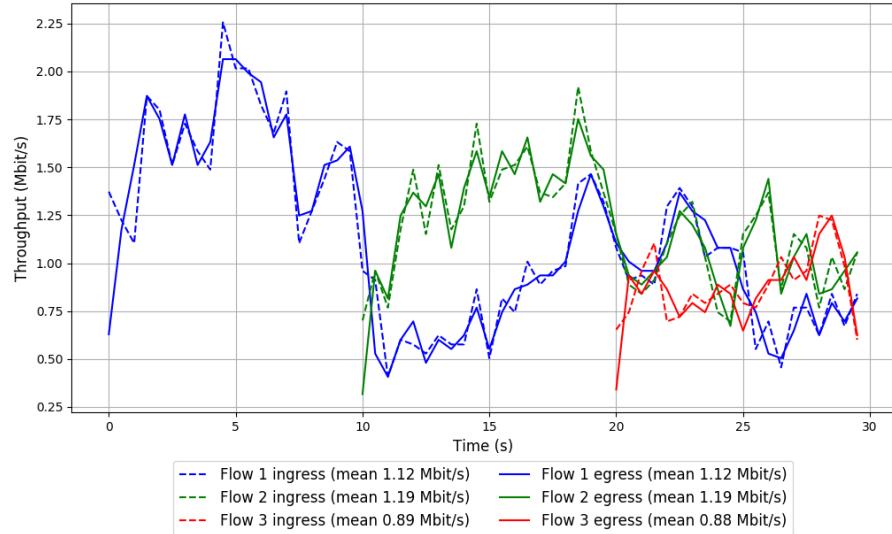


Run 1: Statistics of TCP Vegas

```
Start at: 2018-01-25 18:36:55
End at: 2018-01-25 18:37:25
Local clock offset: 0.672 ms
Remote clock offset: -15.65 ms

# Below is generated by plot.py at 2018-01-25 20:12:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.19 Mbit/s
95th percentile per-packet one-way delay: 182.996 ms
Loss rate: 1.03%
-- Flow 1:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 198.443 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 188.464 ms
Loss rate: 0.61%
-- Flow 3:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 140.017 ms
Loss rate: 2.45%
```

Run 1: Report of TCP Vegas — Data Link

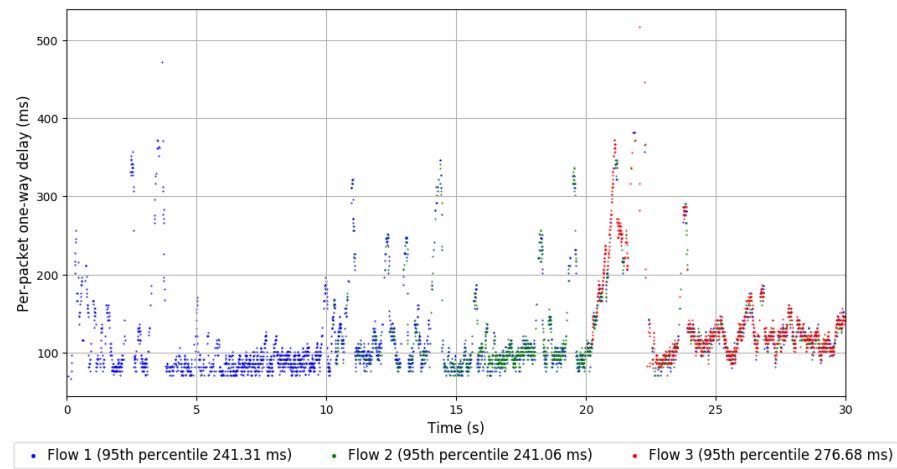
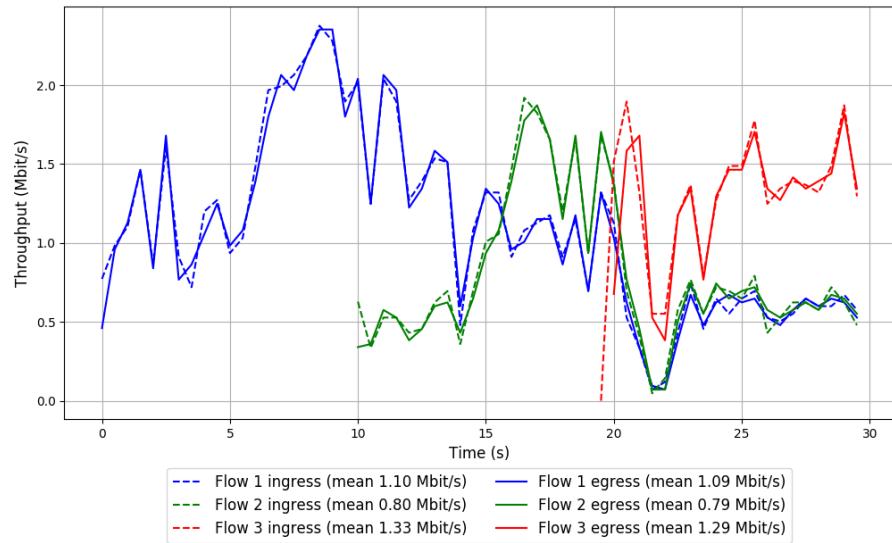


Run 2: Statistics of TCP Vegas

```
Start at: 2018-01-25 18:54:30
End at: 2018-01-25 18:55:00
Local clock offset: 2.609 ms
Remote clock offset: -18.816 ms

# Below is generated by plot.py at 2018-01-25 20:12:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 251.669 ms
Loss rate: 1.90%
-- Flow 1:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 241.305 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 241.065 ms
Loss rate: 1.59%
-- Flow 3:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 276.679 ms
Loss rate: 4.07%
```

Run 2: Report of TCP Vegas — Data Link

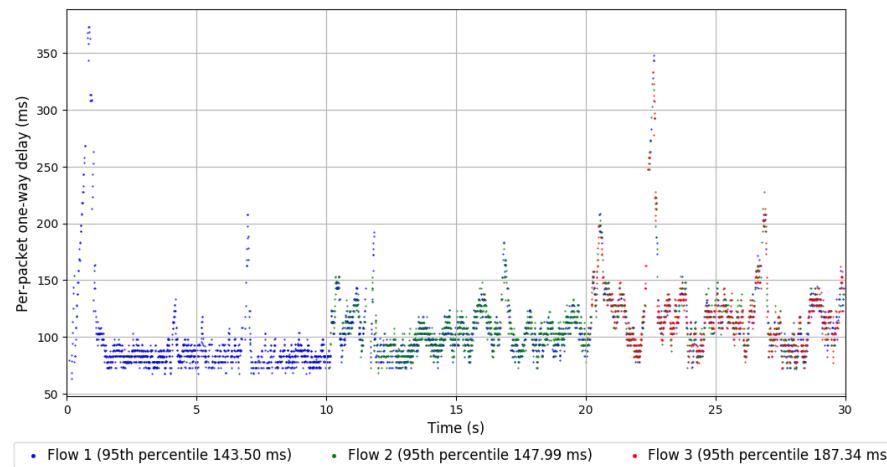
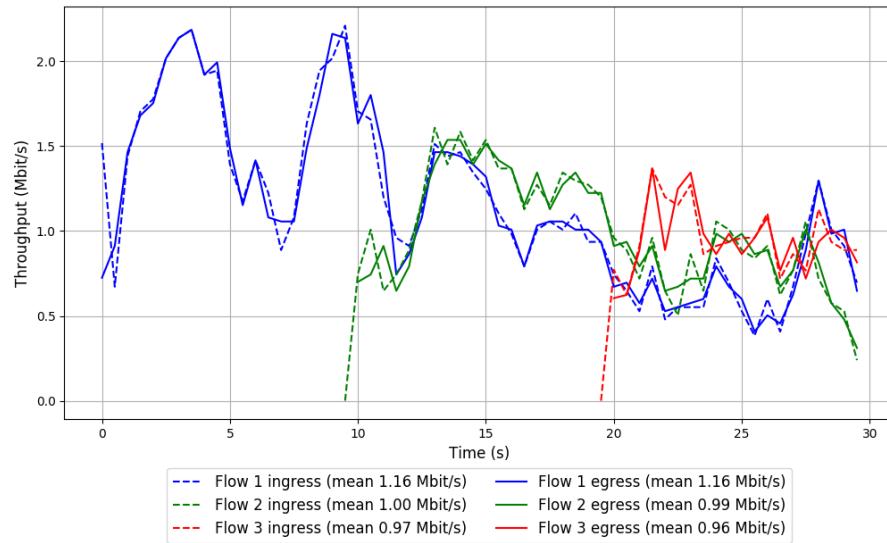


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-25 19:12:07
End at: 2018-01-25 19:12:37
Local clock offset: 0.949 ms
Remote clock offset: -16.648 ms

# Below is generated by plot.py at 2018-01-25 20:12:41
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 152.782 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 143.502 ms
Loss rate: 0.93%
-- Flow 2:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 147.990 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 187.337 ms
Loss rate: 1.87%
```

Run 3: Report of TCP Vegas — Data Link

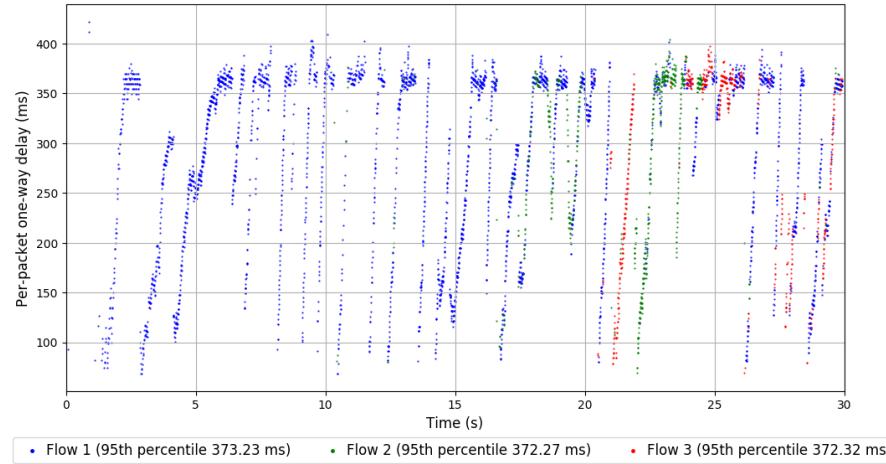
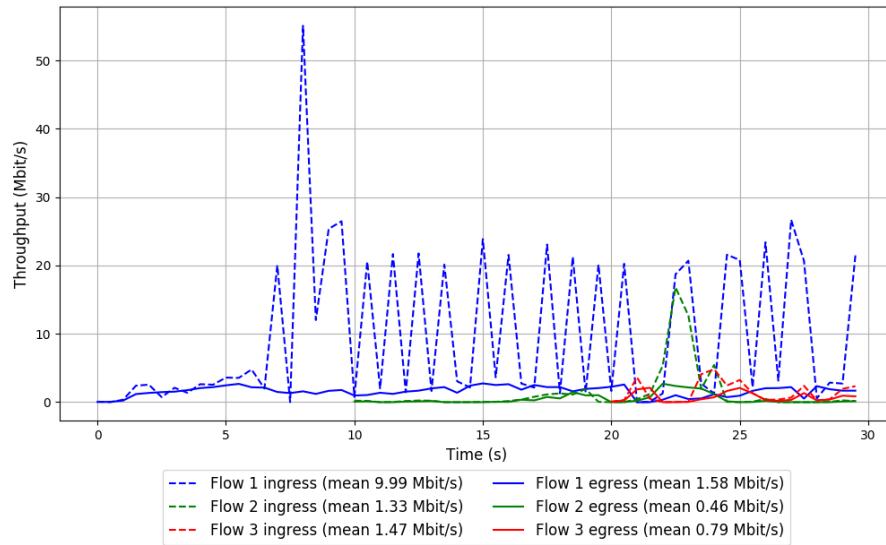


Run 1: Statistics of Verus

```
Start at: 2018-01-25 18:35:49
End at: 2018-01-25 18:36:19
Local clock offset: 2.92 ms
Remote clock offset: -14.498 ms

# Below is generated by plot.py at 2018-01-25 20:12:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.13 Mbit/s
95th percentile per-packet one-way delay: 373.019 ms
Loss rate: 81.22%
-- Flow 1:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 373.228 ms
Loss rate: 84.17%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 372.271 ms
Loss rate: 66.04%
-- Flow 3:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 372.320 ms
Loss rate: 48.42%
```

Run 1: Report of Verus — Data Link

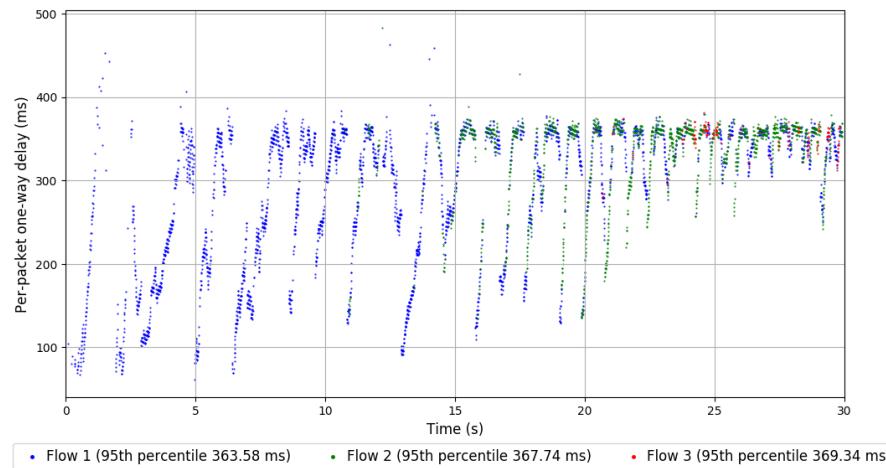
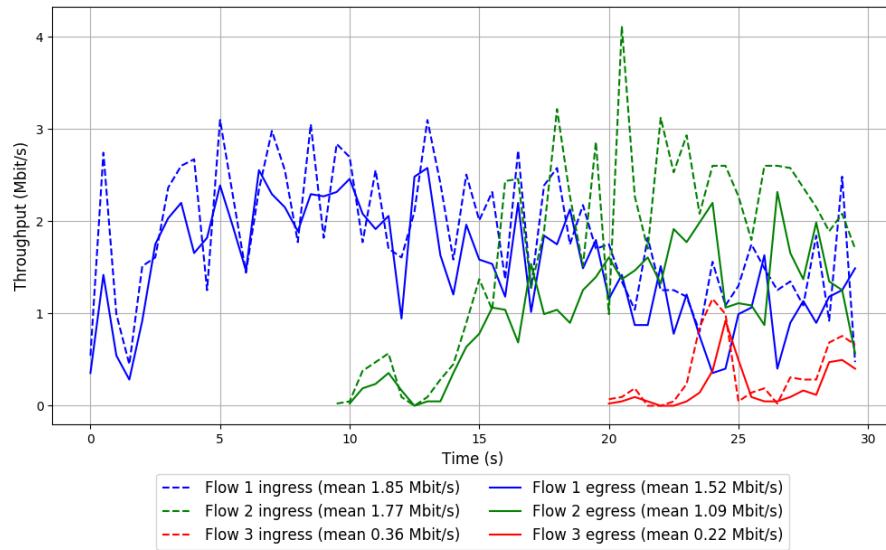


Run 2: Statistics of Verus

```
Start at: 2018-01-25 18:53:24
End at: 2018-01-25 18:53:54
Local clock offset: 1.104 ms
Remote clock offset: -15.649 ms

# Below is generated by plot.py at 2018-01-25 20:12:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.31 Mbit/s
95th percentile per-packet one-way delay: 365.562 ms
Loss rate: 26.88%
-- Flow 1:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 363.584 ms
Loss rate: 17.81%
-- Flow 2:
Average throughput: 1.09 Mbit/s
95th percentile per-packet one-way delay: 367.740 ms
Loss rate: 39.64%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 369.339 ms
Loss rate: 41.08%
```

Run 2: Report of Verus — Data Link

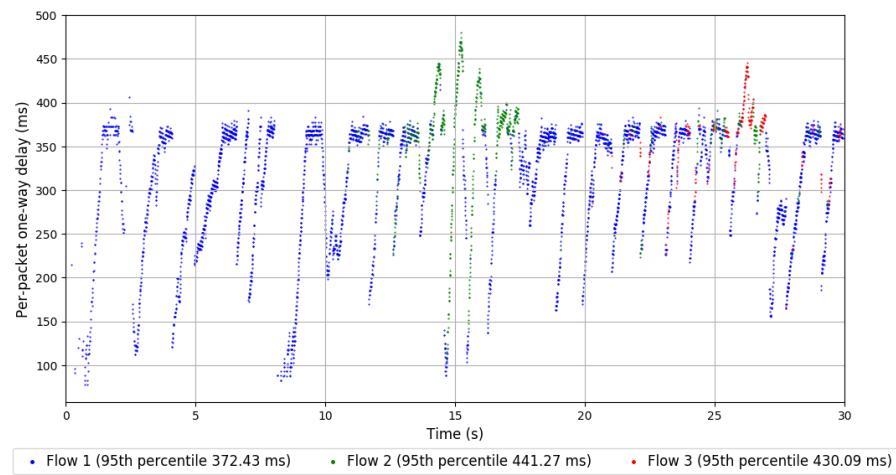
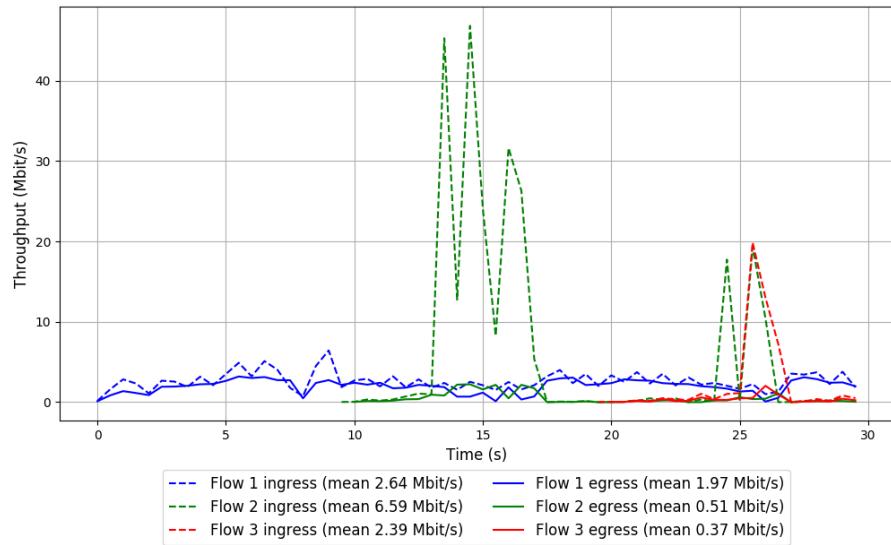


Run 3: Statistics of Verus

```
Start at: 2018-01-25 19:11:01
End at: 2018-01-25 19:11:31
Local clock offset: 4.453 ms
Remote clock offset: -17.839 ms

# Below is generated by plot.py at 2018-01-25 20:12:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.42 Mbit/s
95th percentile per-packet one-way delay: 386.445 ms
Loss rate: 68.71%
-- Flow 1:
Average throughput: 1.97 Mbit/s
95th percentile per-packet one-way delay: 372.426 ms
Loss rate: 25.52%
-- Flow 2:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 441.269 ms
Loss rate: 92.23%
-- Flow 3:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 430.089 ms
Loss rate: 85.17%
```

Run 3: Report of Verus — Data Link

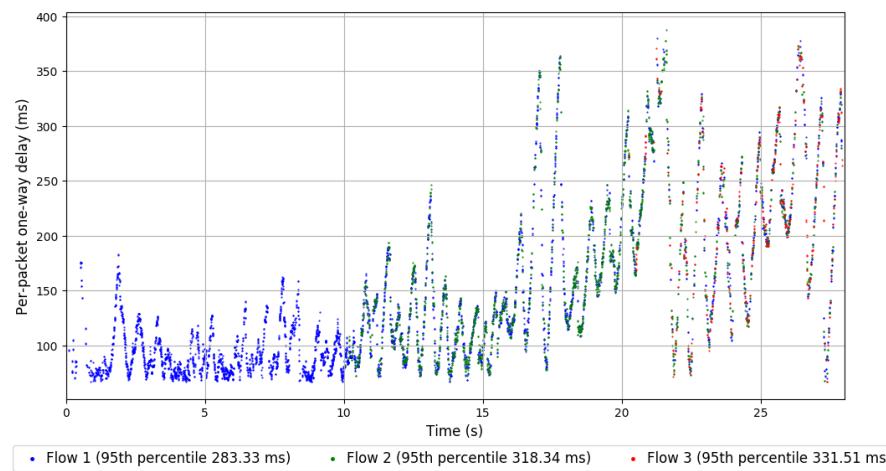
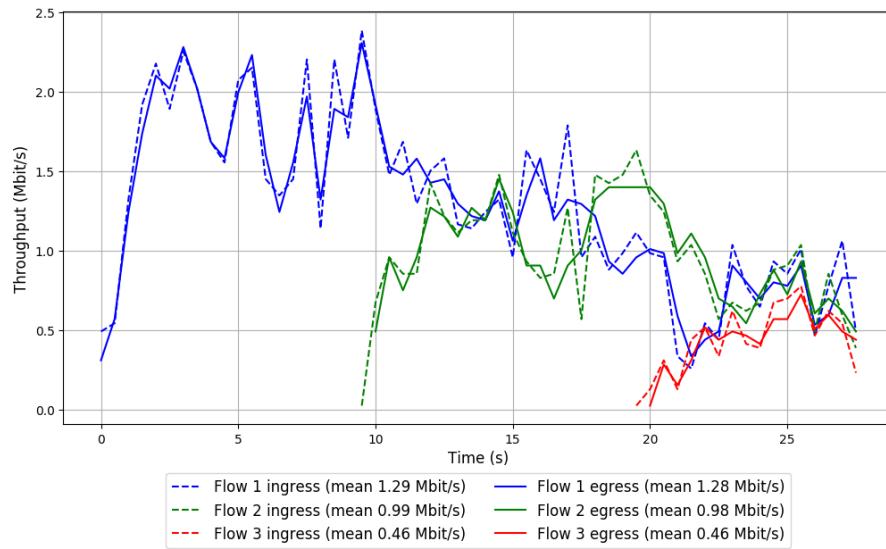


Run 1: Statistics of Copa

```
Start at: 2018-01-25 18:30:20
End at: 2018-01-25 18:30:50
Local clock offset: 1.292 ms
Remote clock offset: -16.182 ms

# Below is generated by plot.py at 2018-01-25 20:12:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 303.328 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 283.335 ms
Loss rate: 0.96%
-- Flow 2:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 318.343 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 331.507 ms
Loss rate: 4.38%
```

Run 1: Report of Copa — Data Link

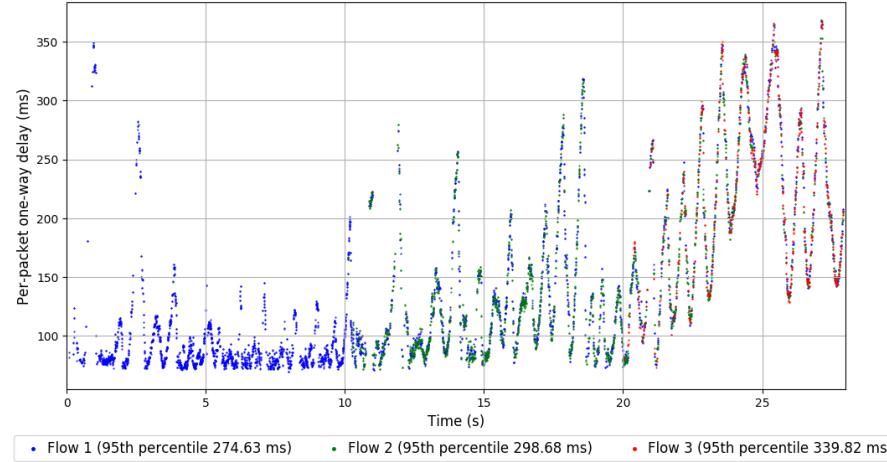
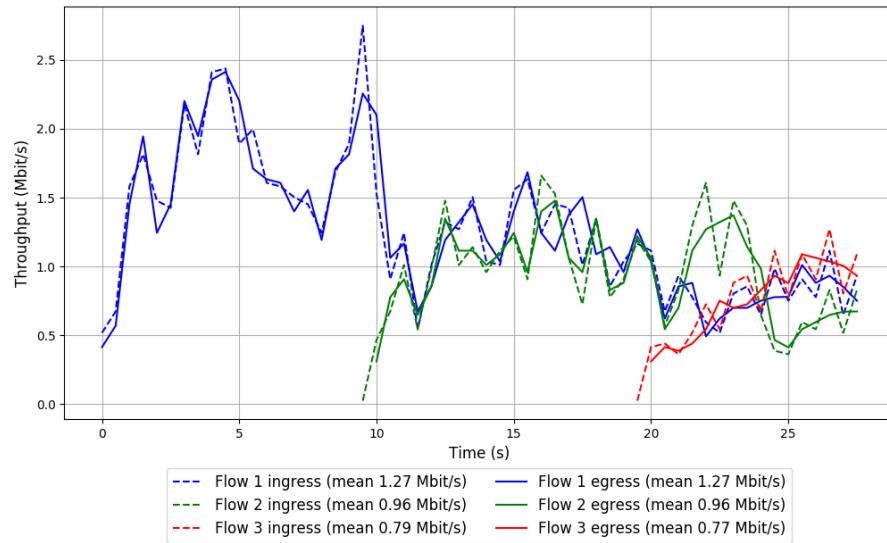


Run 2: Statistics of Copa

```
Start at: 2018-01-25 18:47:54
End at: 2018-01-25 18:48:24
Local clock offset: 3.536 ms
Remote clock offset: -17.681 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.10 Mbit/s
95th percentile per-packet one-way delay: 297.410 ms
Loss rate: 1.24%
-- Flow 1:
Average throughput: 1.27 Mbit/s
95th percentile per-packet one-way delay: 274.627 ms
Loss rate: 0.73%
-- Flow 2:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 298.680 ms
Loss rate: 1.21%
-- Flow 3:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 339.817 ms
Loss rate: 4.19%
```

Run 2: Report of Copa — Data Link

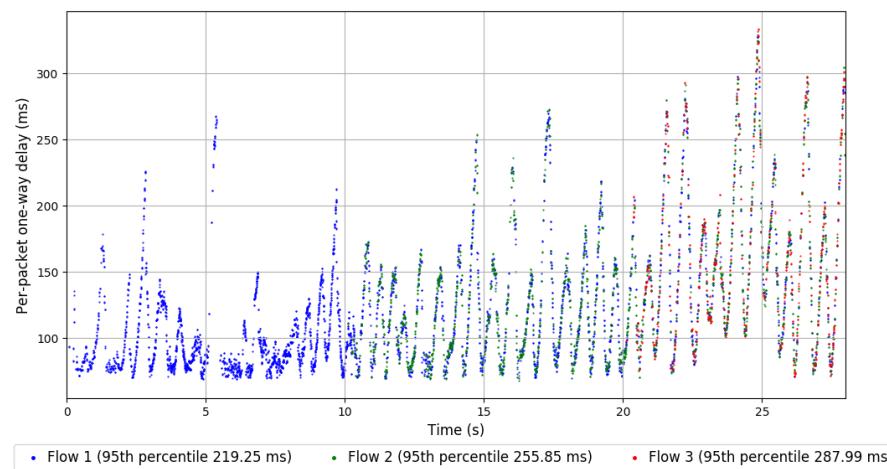
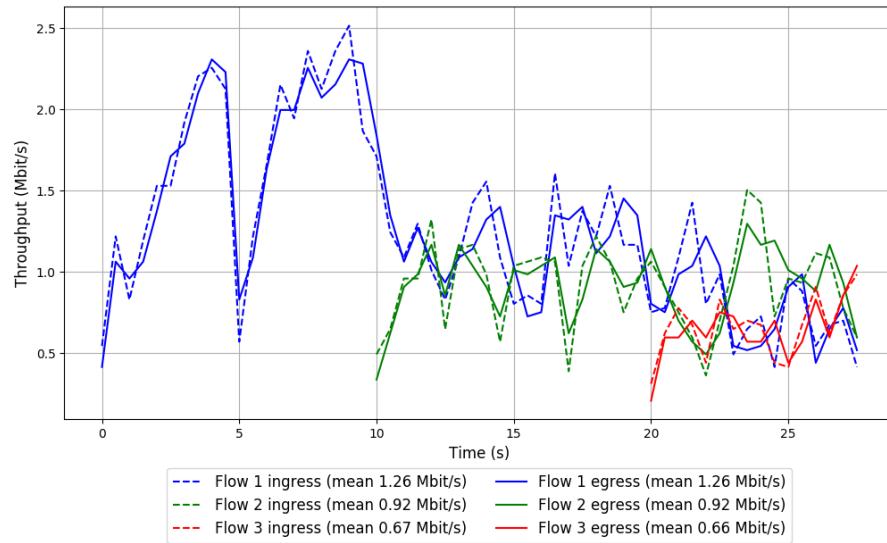


Run 3: Statistics of Copa

```
Start at: 2018-01-25 19:05:30
End at: 2018-01-25 19:06:00
Local clock offset: 3.333 ms
Remote clock offset: -16.313 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 2.03 Mbit/s
95th percentile per-packet one-way delay: 248.456 ms
Loss rate: 0.50%
-- Flow 1:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 219.250 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 255.848 ms
Loss rate: 0.63%
-- Flow 3:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 287.985 ms
Loss rate: 2.21%
```

Run 3: Report of Copa — Data Link

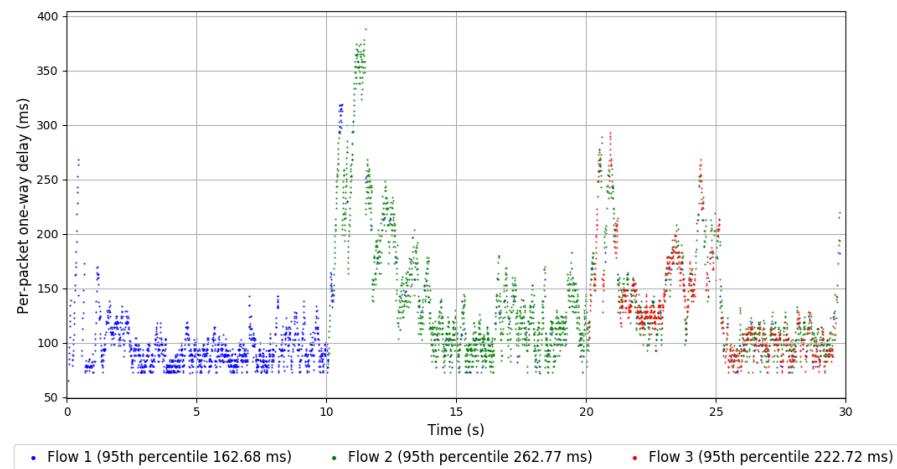
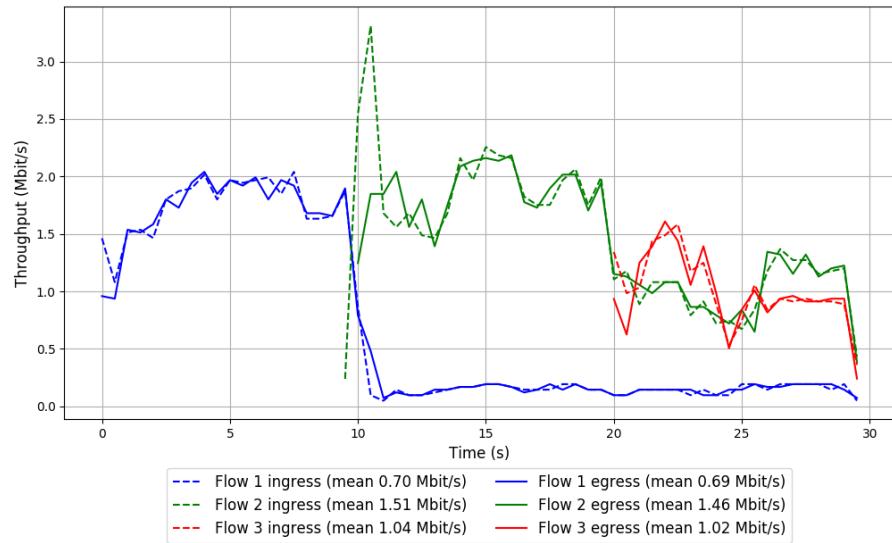


```
Run 1: Statistics of Indigo-2-256

Start at: 2018-01-25 18:31:26
End at: 2018-01-25 18:31:56
Local clock offset: 2.671 ms
Remote clock offset: -18.076 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.99 Mbit/s
95th percentile per-packet one-way delay: 243.242 ms
Loss rate: 2.37%
-- Flow 1:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 162.676 ms
Loss rate: 0.69%
-- Flow 2:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 262.772 ms
Loss rate: 3.46%
-- Flow 3:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 222.724 ms
Loss rate: 2.61%
```

Run 1: Report of Indigo-2-256 — Data Link

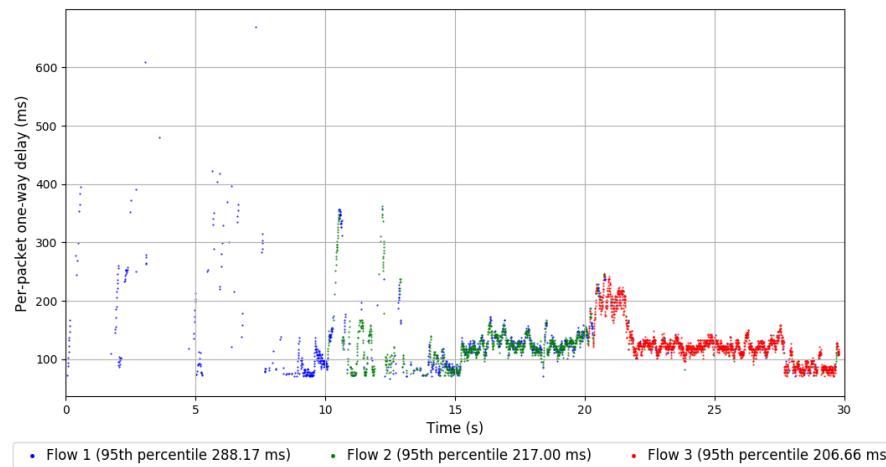
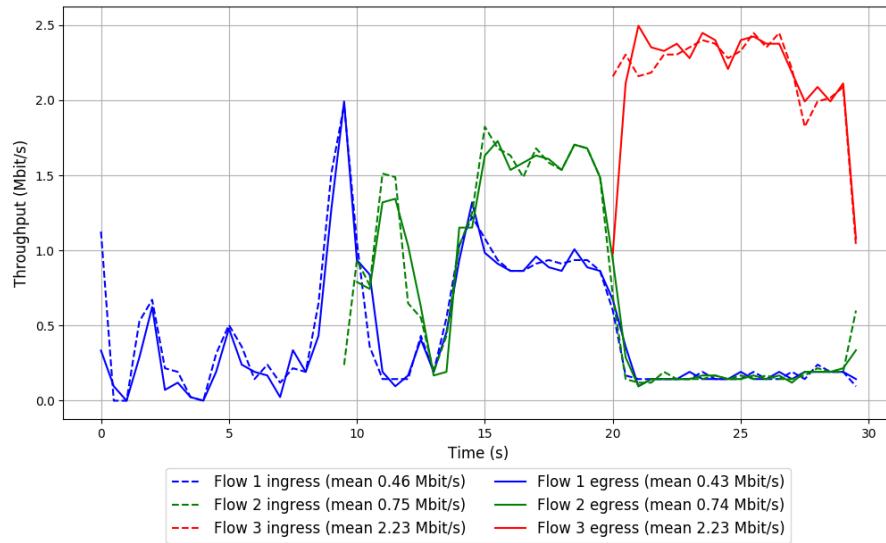


Run 2: Statistics of Indigo-2-256

```
Start at: 2018-01-25 18:49:01
End at: 2018-01-25 18:49:31
Local clock offset: 4.737 ms
Remote clock offset: -16.076 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 216.611 ms
Loss rate: 2.66%
-- Flow 1:
Average throughput: 0.43 Mbit/s
95th percentile per-packet one-way delay: 288.167 ms
Loss rate: 5.57%
-- Flow 2:
Average throughput: 0.74 Mbit/s
95th percentile per-packet one-way delay: 216.999 ms
Loss rate: 2.03%
-- Flow 3:
Average throughput: 2.23 Mbit/s
95th percentile per-packet one-way delay: 206.659 ms
Loss rate: 1.27%
```

Run 2: Report of Indigo-2-256 — Data Link

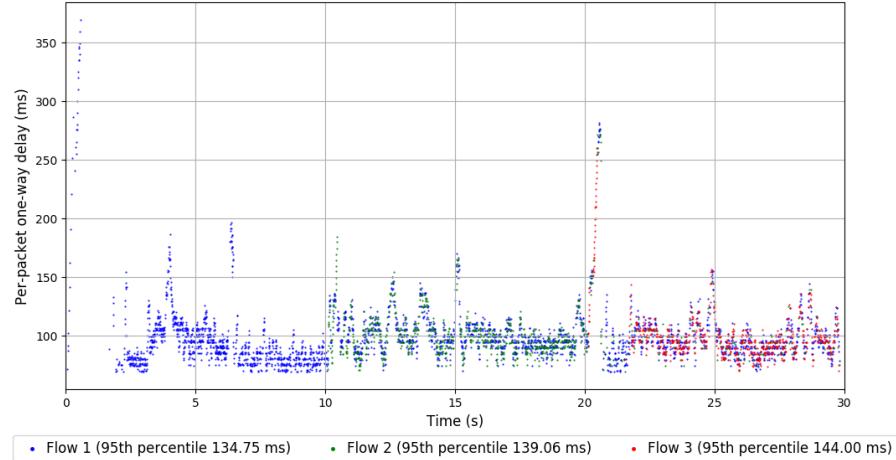
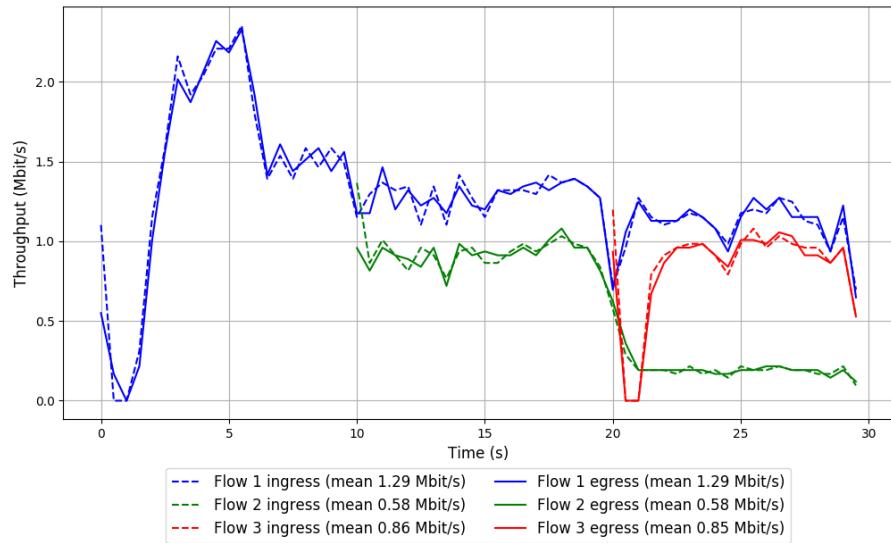


Run 3: Statistics of Indigo-2-256

```
Start at: 2018-01-25 19:06:36
End at: 2018-01-25 19:07:06
Local clock offset: 1.382 ms
Remote clock offset: -18.045 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.94 Mbit/s
95th percentile per-packet one-way delay: 135.933 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 134.746 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 139.064 ms
Loss rate: 1.46%
-- Flow 3:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 144.001 ms
Loss rate: 2.71%
```

Run 3: Report of Indigo-2-256 — Data Link

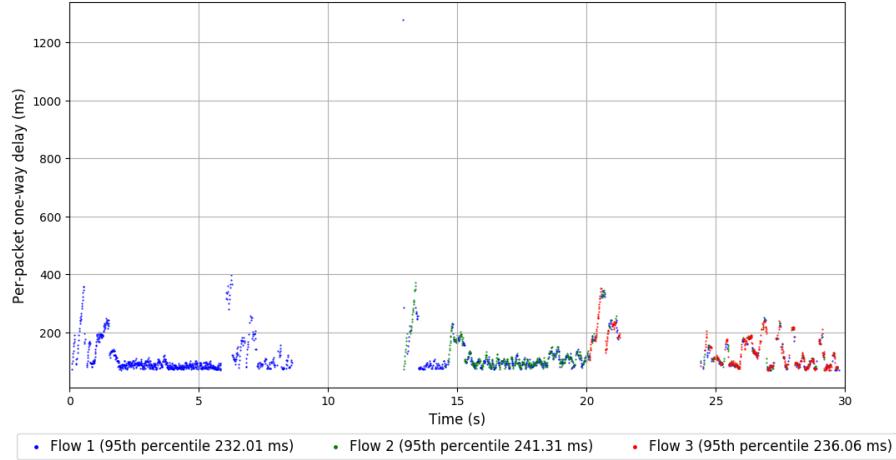
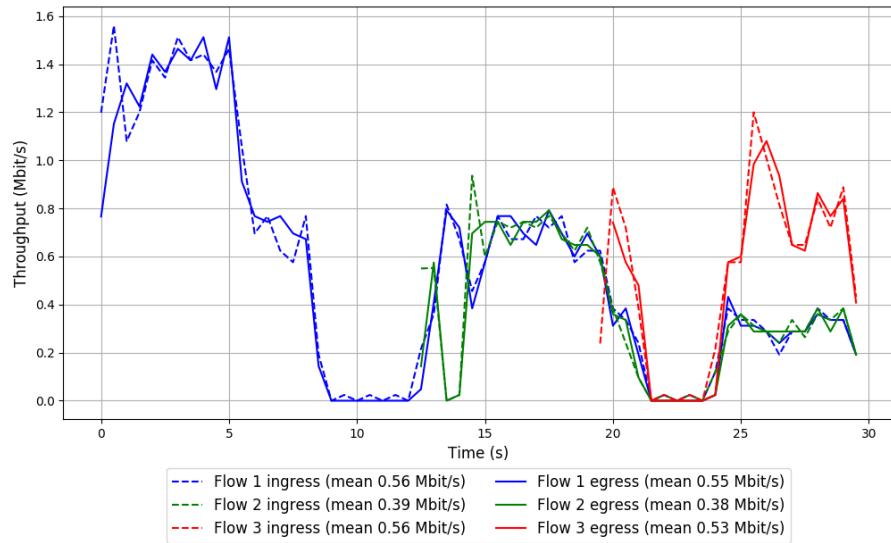


Run 1: Statistics of Indigo-1-32

```
Start at: 2018-01-25 18:42:25
End at: 2018-01-25 18:42:55
Local clock offset: 0.72 ms
Remote clock offset: -16.389 ms

# Below is generated by plot.py at 2018-01-25 20:12:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.93 Mbit/s
95th percentile per-packet one-way delay: 236.057 ms
Loss rate: 3.79%
-- Flow 1:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 232.011 ms
Loss rate: 2.58%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 241.314 ms
Loss rate: 4.72%
-- Flow 3:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 236.057 ms
Loss rate: 6.42%
```

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

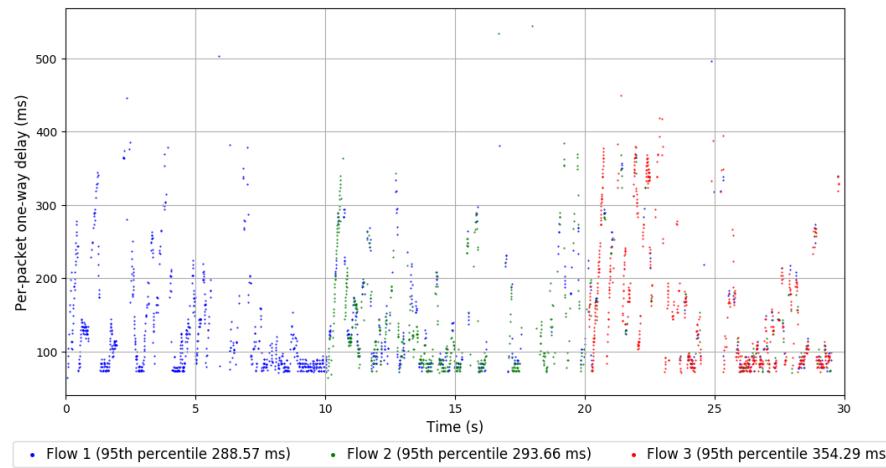
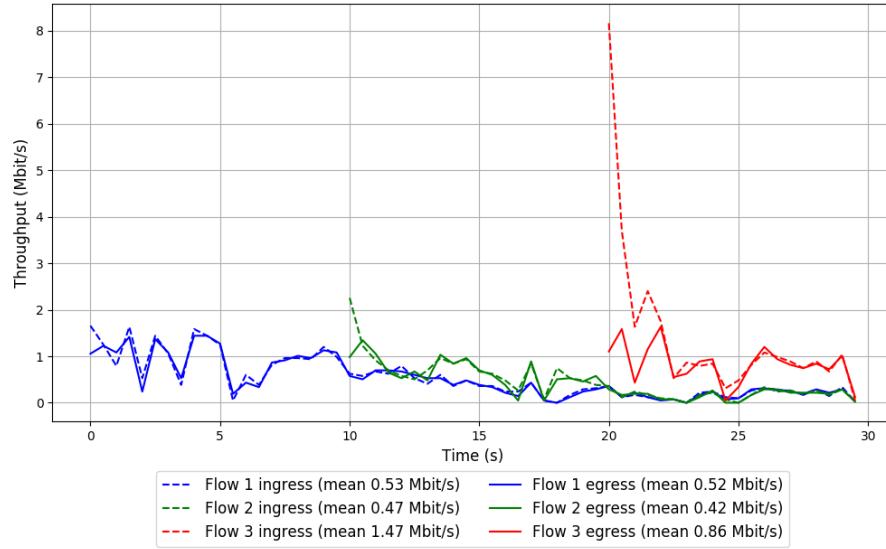


Run 2: Statistics of Indigo-1-32

```
Start at: 2018-01-25 19:00:00
End at: 2018-01-25 19:00:30
Local clock offset: -2.397 ms
Remote clock offset: -23.483 ms

# Below is generated by plot.py at 2018-01-25 20:12:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.07 Mbit/s
95th percentile per-packet one-way delay: 329.199 ms
Loss rate: 18.94%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 288.572 ms
Loss rate: 3.64%
-- Flow 2:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 293.663 ms
Loss rate: 8.86%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 354.294 ms
Loss rate: 42.28%
```

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

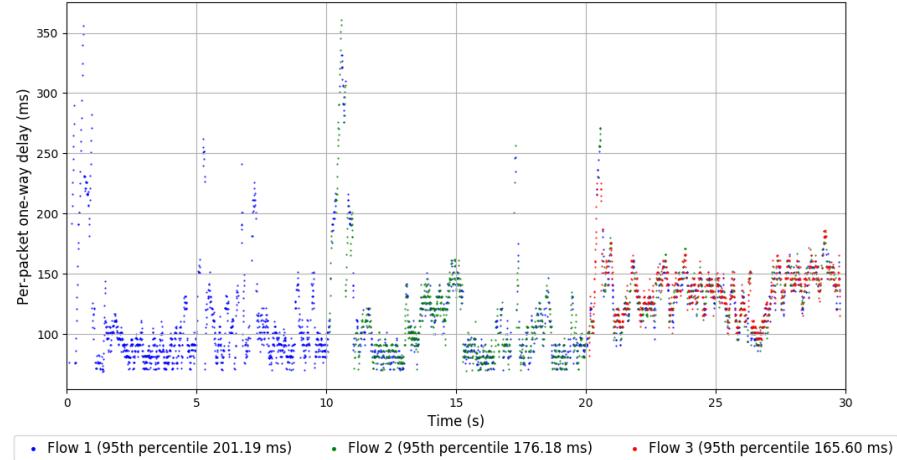
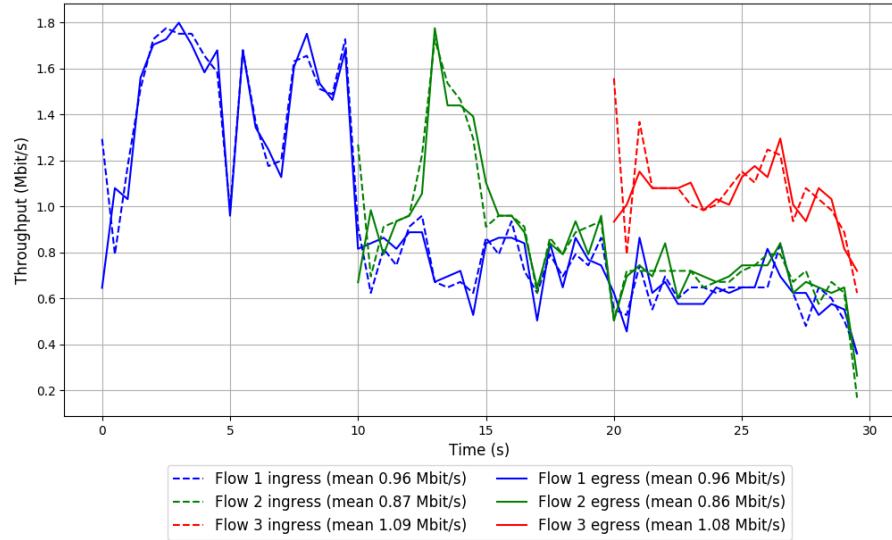


Run 3: Statistics of Indigo-1-32

```
Start at: 2018-01-25 19:17:38
End at: 2018-01-25 19:18:08
Local clock offset: 2.565 ms
Remote clock offset: -14.829 ms

# Below is generated by plot.py at 2018-01-25 20:12:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 181.509 ms
Loss rate: 1.09%
-- Flow 1:
Average throughput: 0.96 Mbit/s
95th percentile per-packet one-way delay: 201.195 ms
Loss rate: 0.63%
-- Flow 2:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 176.175 ms
Loss rate: 0.99%
-- Flow 3:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 165.597 ms
Loss rate: 2.48%
```

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

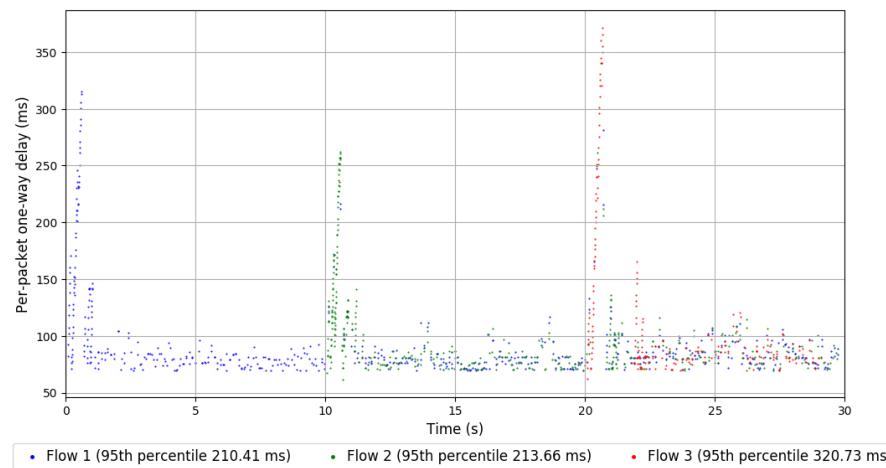
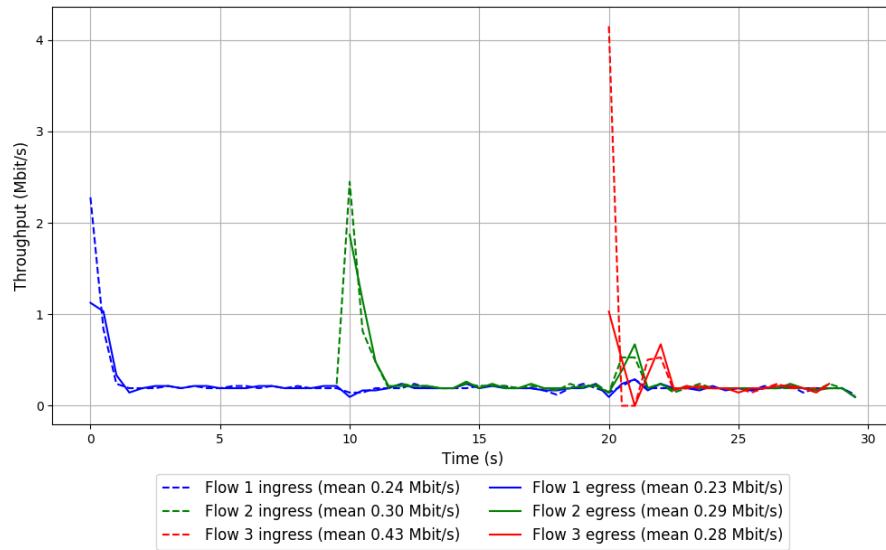


```
Run 1: Statistics of Indigo-1-128

Start at: 2018-01-25 18:32:32
End at: 2018-01-25 18:33:02
Local clock offset: 3.288 ms
Remote clock offset: -15.409 ms

# Below is generated by plot.py at 2018-01-25 20:12:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 230.610 ms
Loss rate: 11.69%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 210.413 ms
Loss rate: 6.17%
-- Flow 2:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 213.663 ms
Loss rate: 4.00%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 320.726 ms
Loss rate: 34.07%
```

Run 1: Report of Indigo-1-128 — Data Link

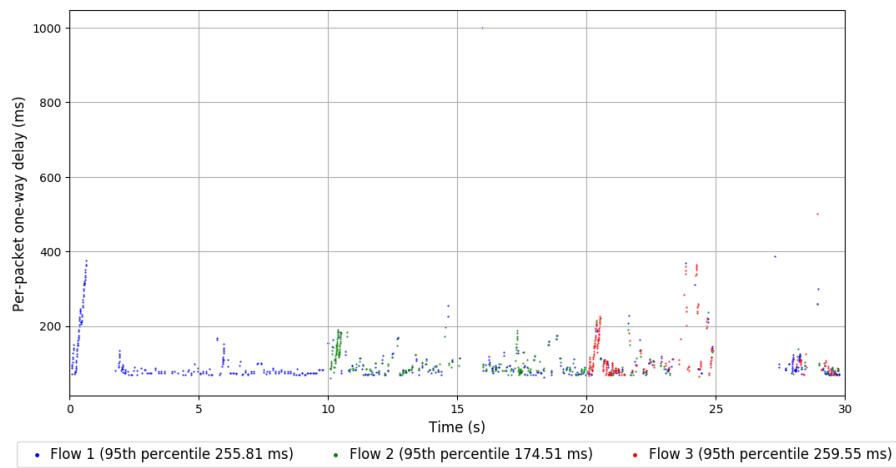
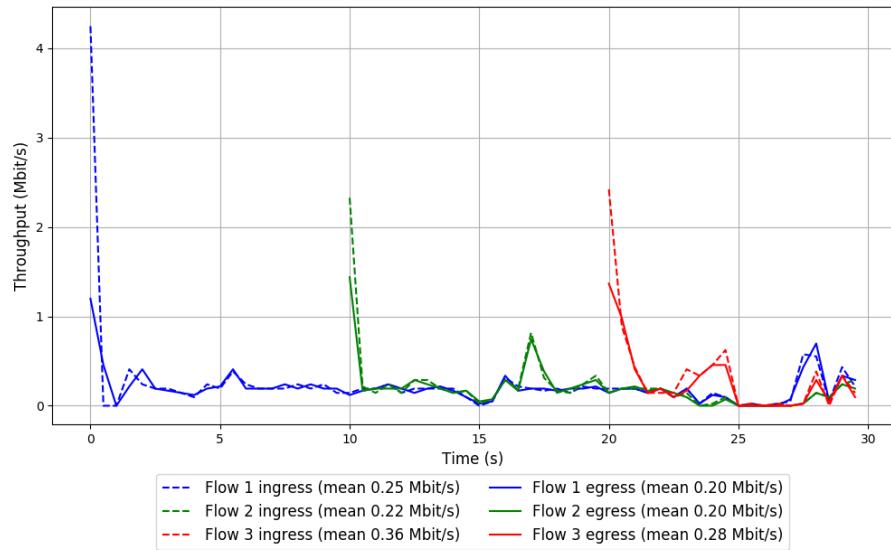


Run 2: Statistics of Indigo-1-128

```
Start at: 2018-01-25 18:50:07
End at: 2018-01-25 18:50:37
Local clock offset: 3.458 ms
Remote clock offset: -15.528 ms

# Below is generated by plot.py at 2018-01-25 20:12:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 229.039 ms
Loss rate: 17.73%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 255.807 ms
Loss rate: 18.48%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 174.515 ms
Loss rate: 13.01%
-- Flow 3:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 259.546 ms
Loss rate: 22.15%
```

Run 2: Report of Indigo-1-128 — Data Link



Run 3: Statistics of Indigo-1-128

```
Start at: 2018-01-25 19:07:43
End at: 2018-01-25 19:08:13
Local clock offset: 0.493 ms
Remote clock offset: -16.261 ms

# Below is generated by plot.py at 2018-01-25 20:12:54
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 183.020 ms
Loss rate: 8.49%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 201.947 ms
Loss rate: 6.45%
-- Flow 2:
Average throughput: 0.28 Mbit/s
95th percentile per-packet one-way delay: 172.345 ms
Loss rate: 8.33%
-- Flow 3:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 187.035 ms
Loss rate: 12.74%
```

Run 3: Report of Indigo-1-128 — Data Link

