

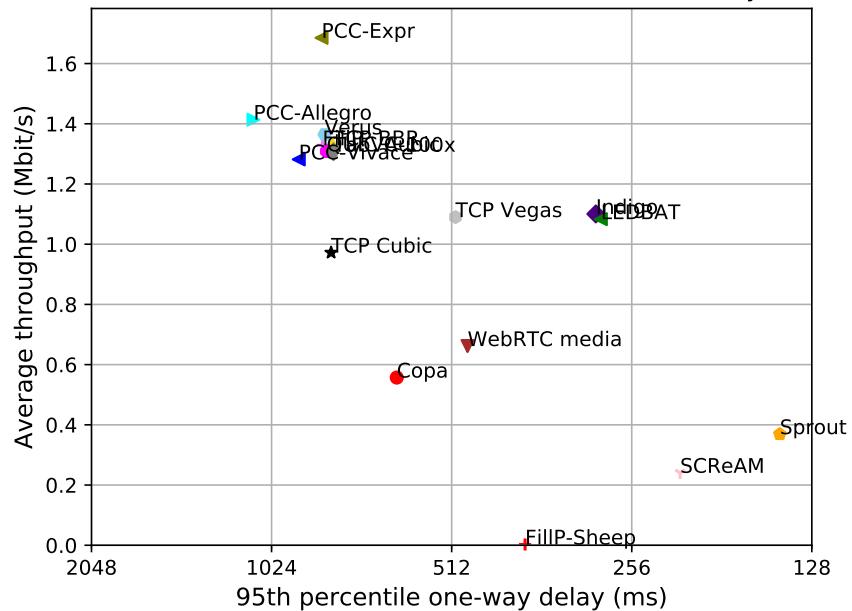
Pantheon Report

Generated at 2018-06-30 13:55:25 (UTC).
Data path: China ppp0 ppp0 (*remote*) → AWS Korea Ethernet (*local*).
Repeated the test of 17 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).
NTP offsets were measured against `ntp.nict.jp` and have been applied to correct the timestamps in logs.

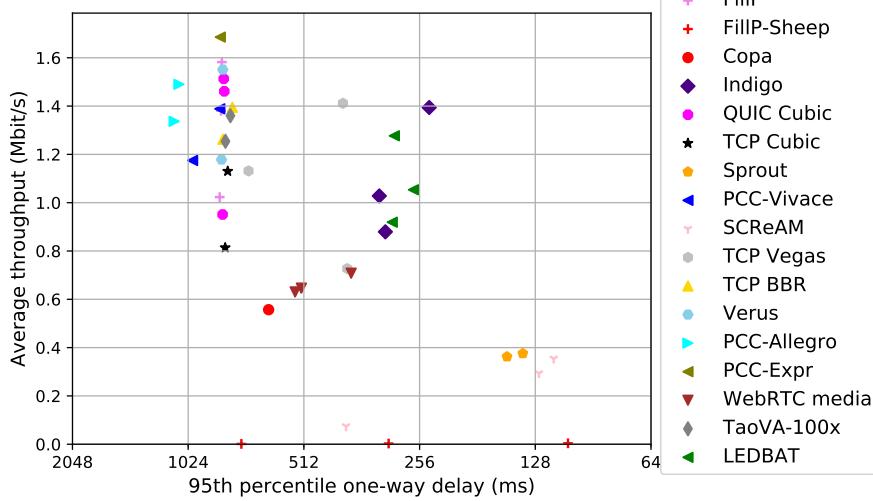
Git summary:

```
branch: master @ 715dc5f09d172e419699f6f17f1cb4c45064f212
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ 30060ab034deb3424347f5cc3db86198eac35d2a
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
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/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
  M src/ScreamClient
  M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

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



test from China ppp0 to AWS Korea, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	2	0.84	0.57	0.36	786.50	812.42	818.08	6.17	10.33	16.31
Copa		0.42	0.12	0.19	620.02	678.51	656.60	6.00	15.90	12.80
TCP Cubic		0.70	0.35	0.38	811.90	758.85	555.85	11.62	14.69	22.64
FillP		0.85	0.48	0.59	838.30	840.12	853.32	43.00	45.85	59.67
FillP-Sheep		0.00	0.00	0.00	100.01	275.59	313.99	56.46	32.65	6.80
Indigo		0.56	0.58	0.51	261.52	267.19	358.59	0.36	0.72	1.11
LEDBAT		0.67	0.65	0.66	277.04	288.61	285.33	2.82	0.61	4.53
PCC-Allegro		0.90	0.69	0.26	879.67	1087.69	1007.72	74.15	83.75	87.69
PCC-Expr		1.38	0.00	1.14	842.48	819.02	851.03	71.28	92.31	86.30
QUIC Cubic		0.93	0.42	0.36	828.09	829.69	828.86	8.41	14.59	21.22
SCReAM		0.13	0.13	0.15	212.14	137.40	159.59	4.14	18.55	14.27
Sprout		0.17	0.18	0.22	402.71	134.37	153.23	2.04	0.95	1.40
TaoVA-100x		0.82	0.57	0.35	787.16	816.95	831.25	6.57	11.12	45.84
TCP Vegas		0.50	0.48	0.86	471.74	520.06	539.44	4.31	2.71	2.93
Verus		1.15	0.34	0.02	835.87	830.37	830.79	18.97	11.85	7.14
PCC-Vivace		0.78	0.62	0.39	892.58	861.84	1077.43	46.16	59.05	70.86
WebRTC media		0.23	0.26	0.17	567.04	444.37	485.16	0.64	0.30	3.26

Run 1: Statistics of TCP BBR

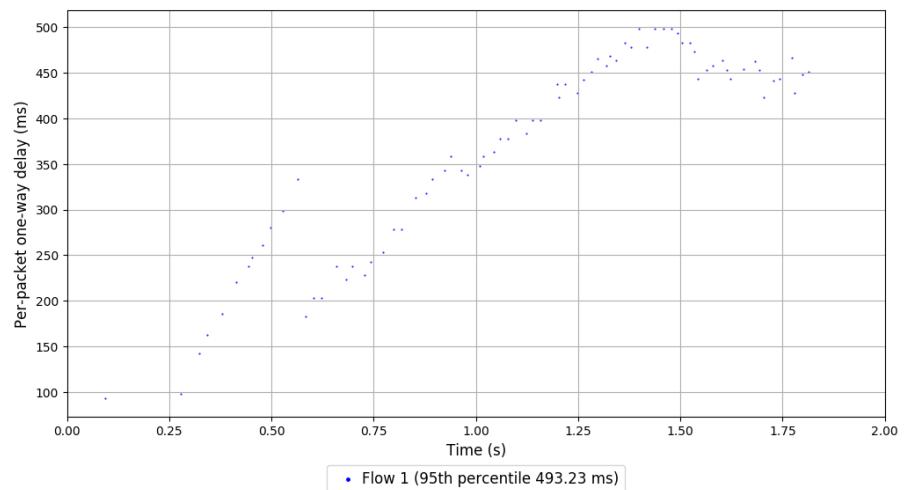
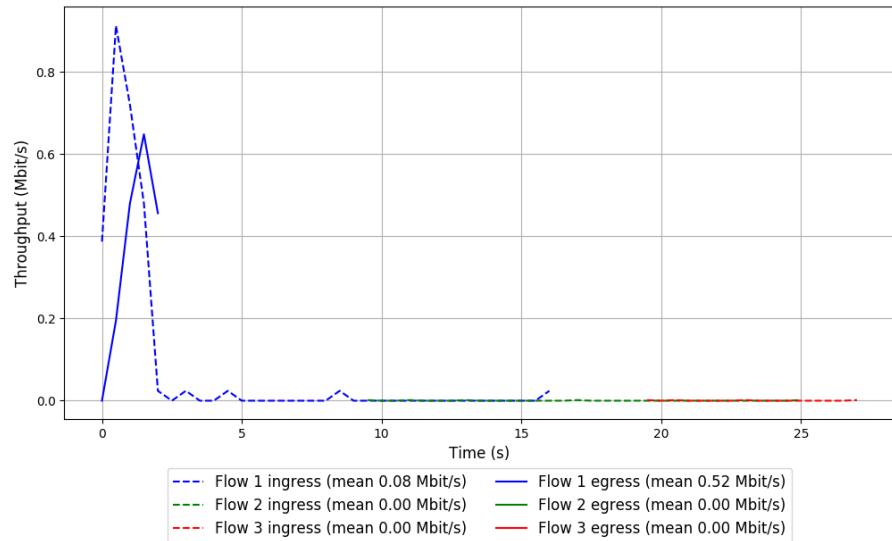
Start at: 2018-06-30 12:47:29

End at: 2018-06-30 12:47:59

Local clock offset: -3.918 ms

Remote clock offset: -9.564 ms

Run 1: Report of TCP BBR — Data Link

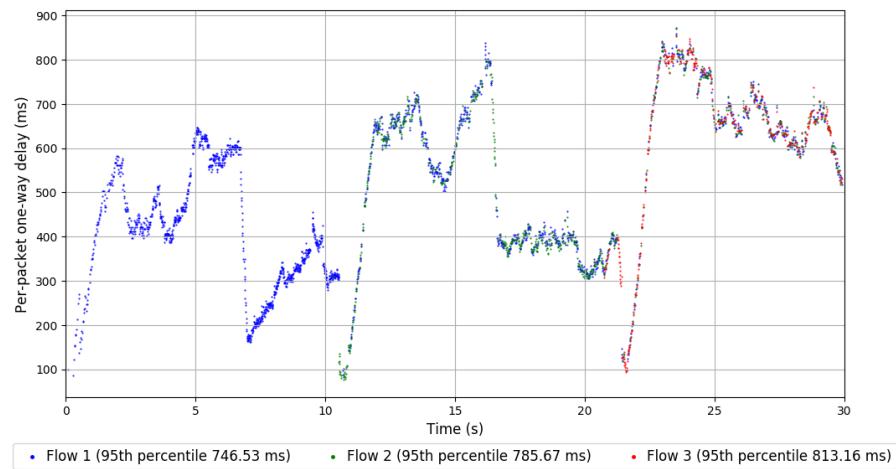
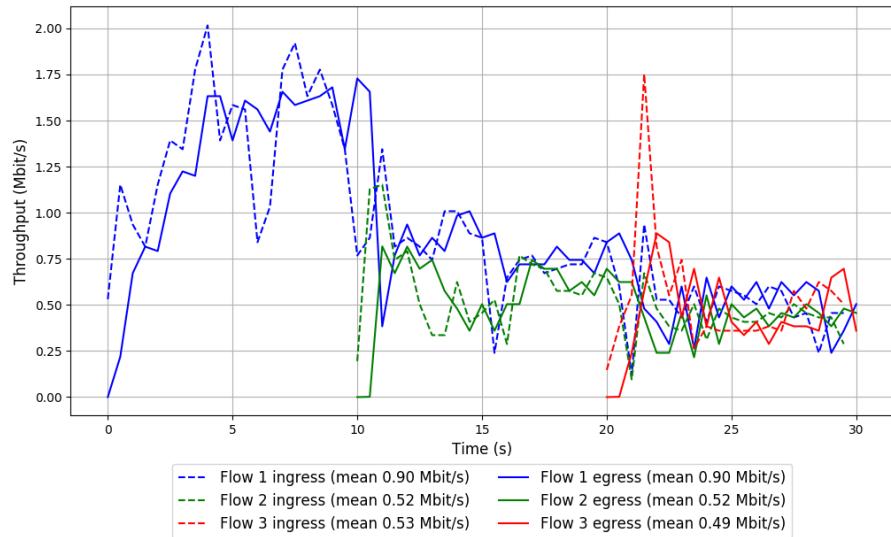


Run 2: Statistics of TCP BBR

```
Start at: 2018-06-30 13:11:54
End at: 2018-06-30 13:12:24
Local clock offset: 7.502 ms
Remote clock offset: -9.824 ms

# Below is generated by plot.py at 2018-06-30 13:54:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 785.777 ms
Loss rate: 2.56%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 746.527 ms
Loss rate: 1.02%
-- Flow 2:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 785.668 ms
Loss rate: 2.31%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 813.160 ms
Loss rate: 10.93%
```

Run 2: Report of TCP BBR — Data Link

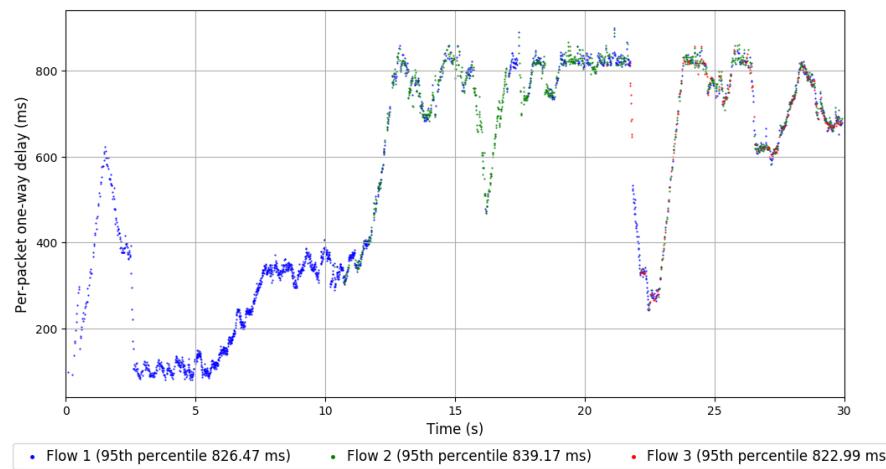
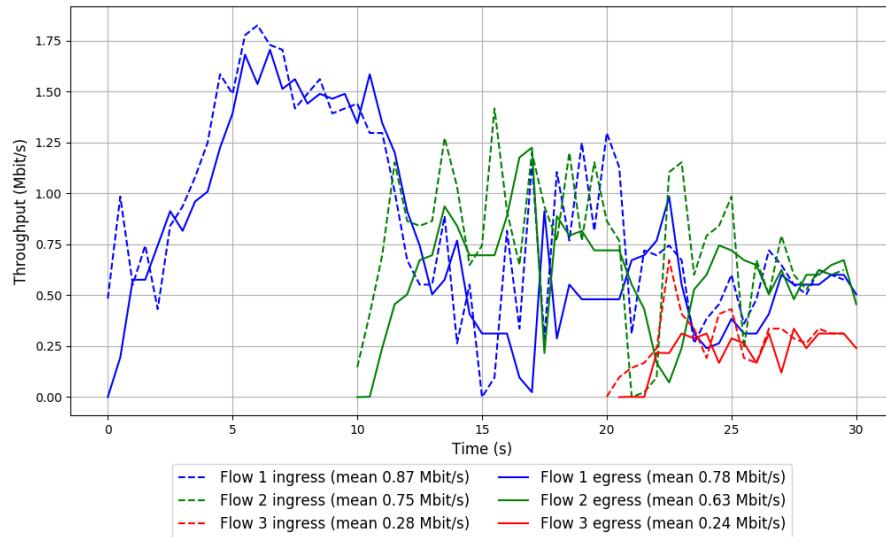


Run 3: Statistics of TCP BBR

```
Start at: 2018-06-30 13:36:00
End at: 2018-06-30 13:36:31
Local clock offset: 9.034 ms
Remote clock offset: -10.039 ms

# Below is generated by plot.py at 2018-06-30 13:54:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 831.483 ms
Loss rate: 14.39%
-- Flow 1:
Average throughput: 0.78 Mbit/s
95th percentile per-packet one-way delay: 826.466 ms
Loss rate: 11.32%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 839.175 ms
Loss rate: 18.35%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 822.992 ms
Loss rate: 21.69%
```

Run 3: Report of TCP BBR — Data Link

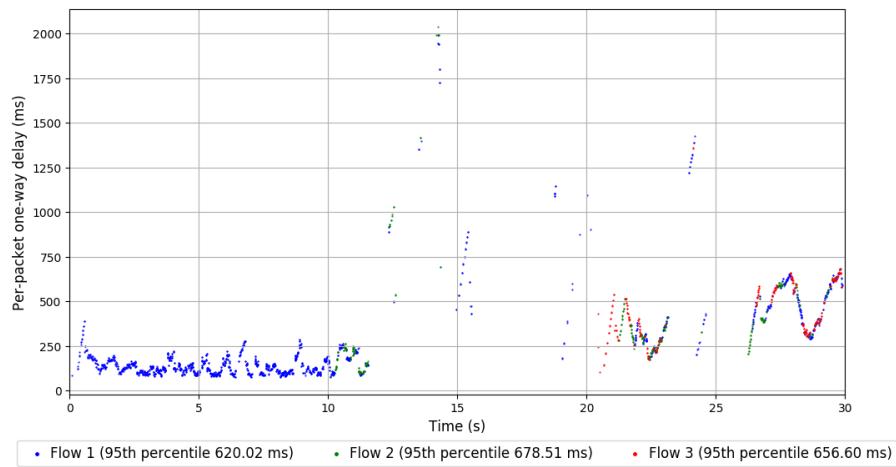
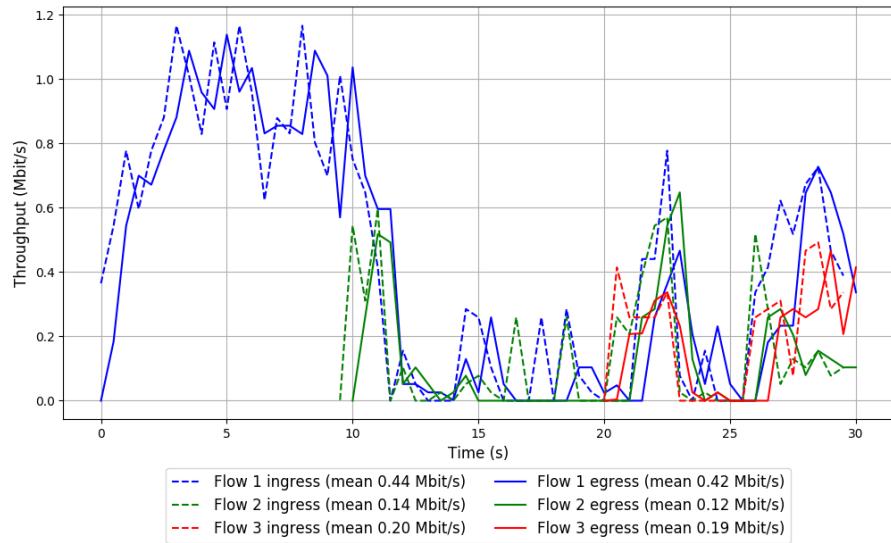


Run 1: Statistics of Copa

```
Start at: 2018-06-30 12:48:47
End at: 2018-06-30 12:49:17
Local clock offset: -2.243 ms
Remote clock offset: -9.135 ms

# Below is generated by plot.py at 2018-06-30 13:54:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 632.428 ms
Loss rate: 8.32%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 620.016 ms
Loss rate: 6.00%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 678.510 ms
Loss rate: 15.90%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 656.602 ms
Loss rate: 12.80%
```

Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

/home/ubuntu/pantheon/data/2018-06-30T12-41-China-ppp0-to-AWS-Korea-3-runs-3-flows/copa_stat

Run 2: Report of Copa — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Copa

Start at: 2018-06-30 13:37:22
End at: 2018-06-30 13:37:52
Local clock offset: 8.959 ms
Remote clock offset: -9.994 ms

Run 3: Report of Copa — Data Link

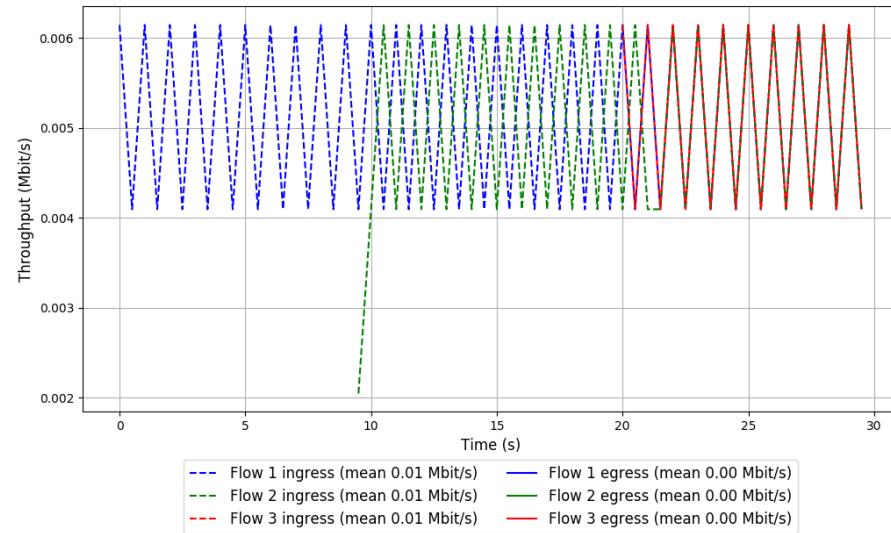


Figure is missing

Run 1: Statistics of TCP Cubic

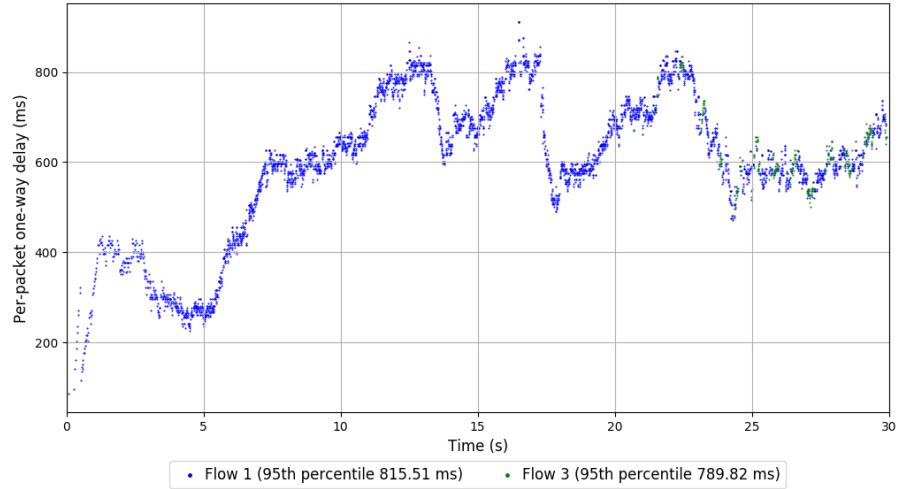
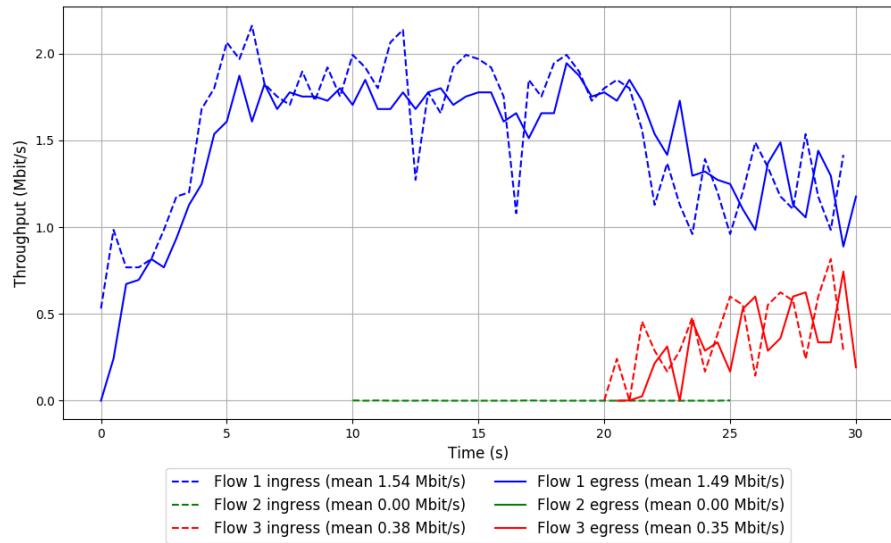
Start at: 2018-06-30 12:42:09

End at: 2018-06-30 12:42:39

Local clock offset: -5.936 ms

Remote clock offset: -9.031 ms

Run 1: Report of TCP Cubic — Data Link

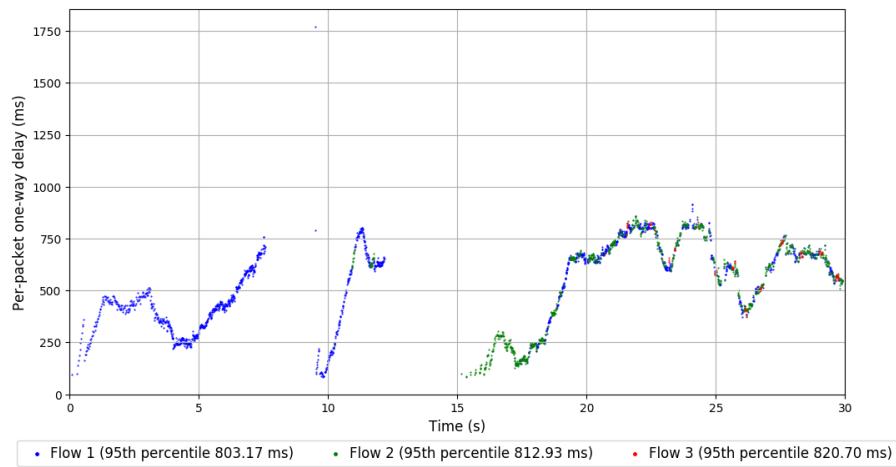
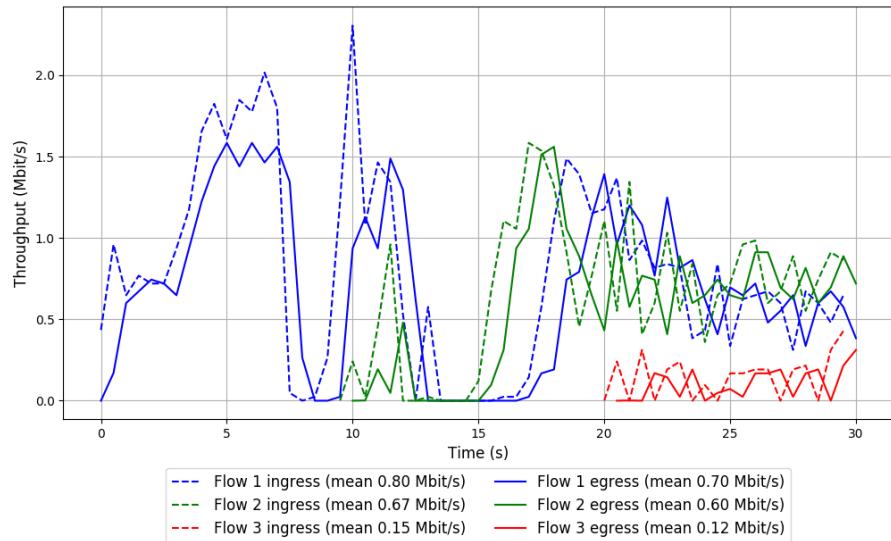


Run 2: Statistics of TCP Cubic

```
Start at: 2018-06-30 13:07:39
End at: 2018-06-30 13:08:09
Local clock offset: 6.929 ms
Remote clock offset: -9.737 ms

# Below is generated by plot.py at 2018-06-30 13:54:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 808.157 ms
Loss rate: 12.82%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 803.170 ms
Loss rate: 13.01%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 812.932 ms
Loss rate: 10.75%
-- Flow 3:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 820.697 ms
Loss rate: 28.33%
```

Run 2: Report of TCP Cubic — Data Link

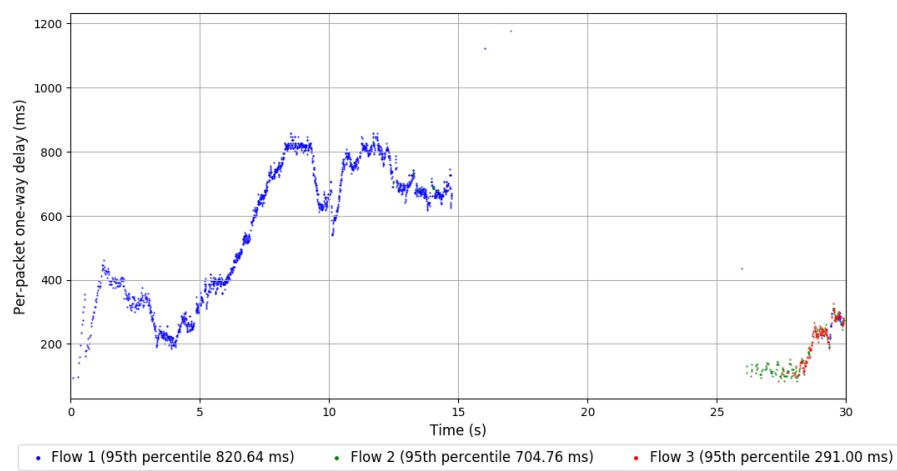
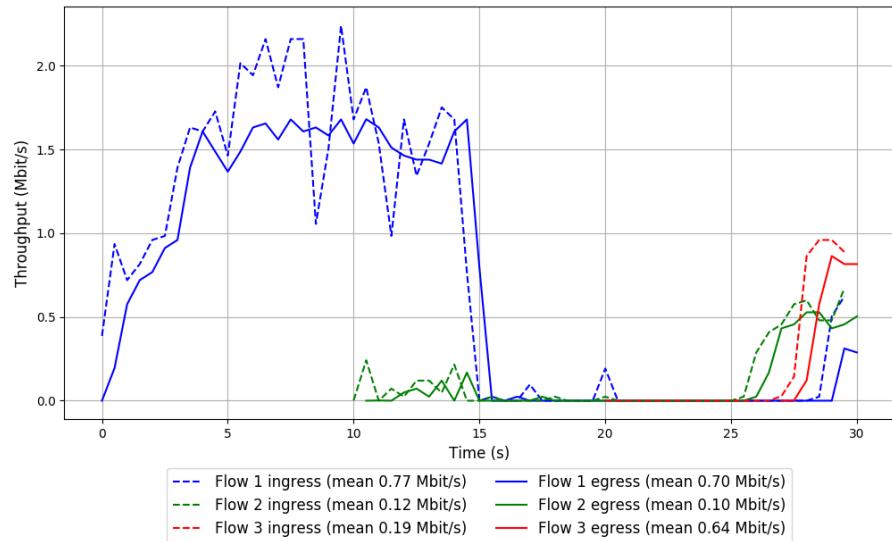


Run 3: Statistics of TCP Cubic

```
Start at: 2018-06-30 13:31:46
End at: 2018-06-30 13:32:16
Local clock offset: 8.87 ms
Remote clock offset: -10.093 ms

# Below is generated by plot.py at 2018-06-30 13:54:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 820.354 ms
Loss rate: 11.44%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 820.640 ms
Loss rate: 10.22%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 704.763 ms
Loss rate: 18.62%
-- Flow 3:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 291.004 ms
Loss rate: 16.96%
```

Run 3: Report of TCP Cubic — Data Link

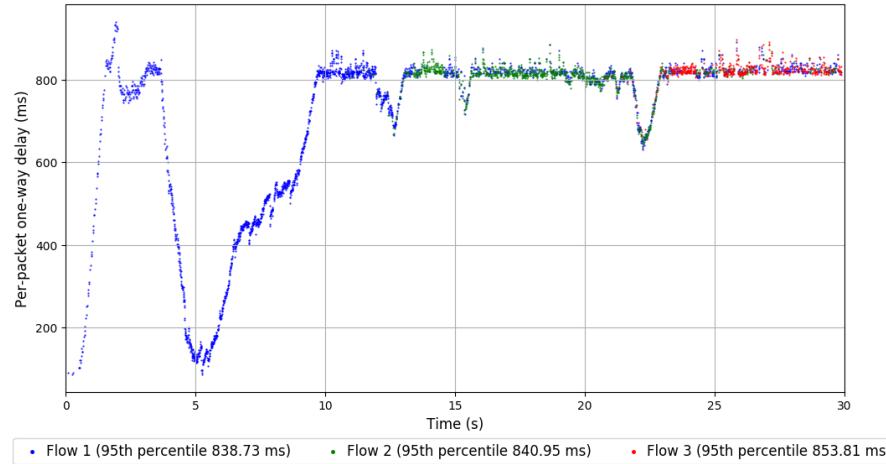
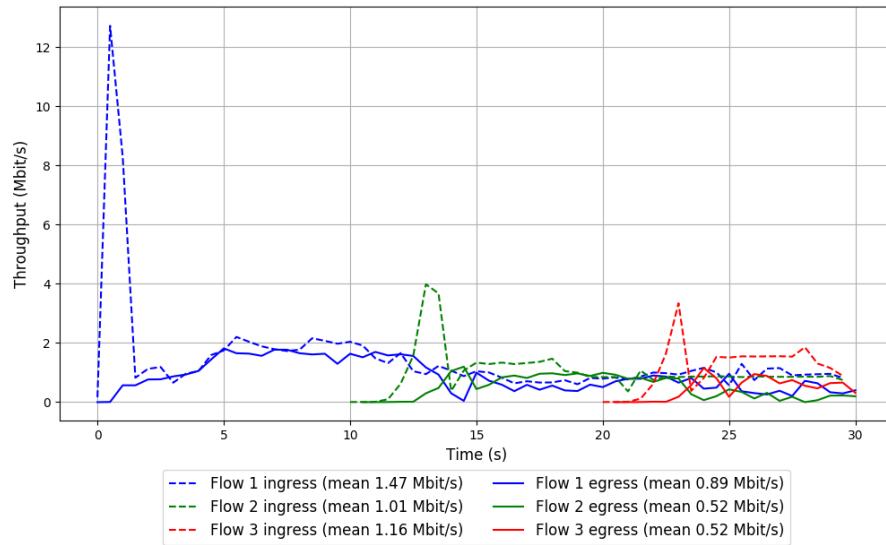


```
Run 1: Statistics of FillP
```

```
Start at: 2018-06-30 12:57:35
End at: 2018-06-30 12:58:05
Local clock offset: 3.82 ms
Remote clock offset: -9.454 ms

# Below is generated by plot.py at 2018-06-30 13:54:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 841.101 ms
Loss rate: 45.69%
-- Flow 1:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 838.727 ms
Loss rate: 39.92%
-- Flow 2:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 840.951 ms
Loss rate: 50.85%
-- Flow 3:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 853.806 ms
Loss rate: 58.79%
```

Run 1: Report of FillP — Data Link

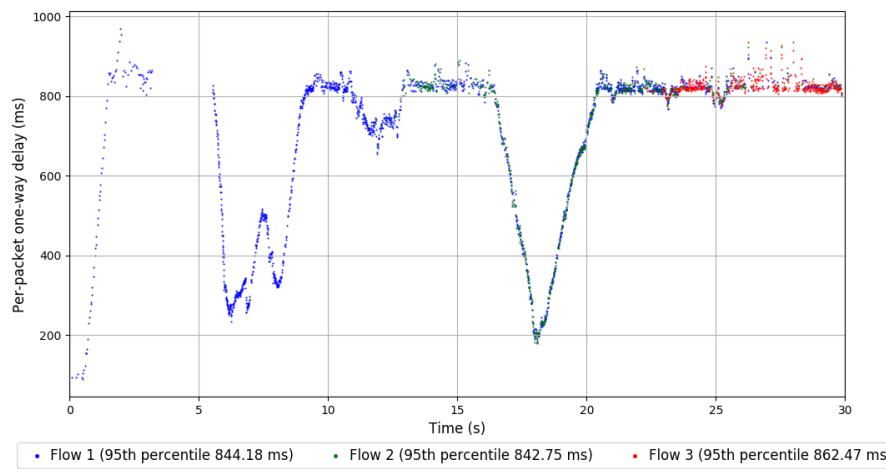
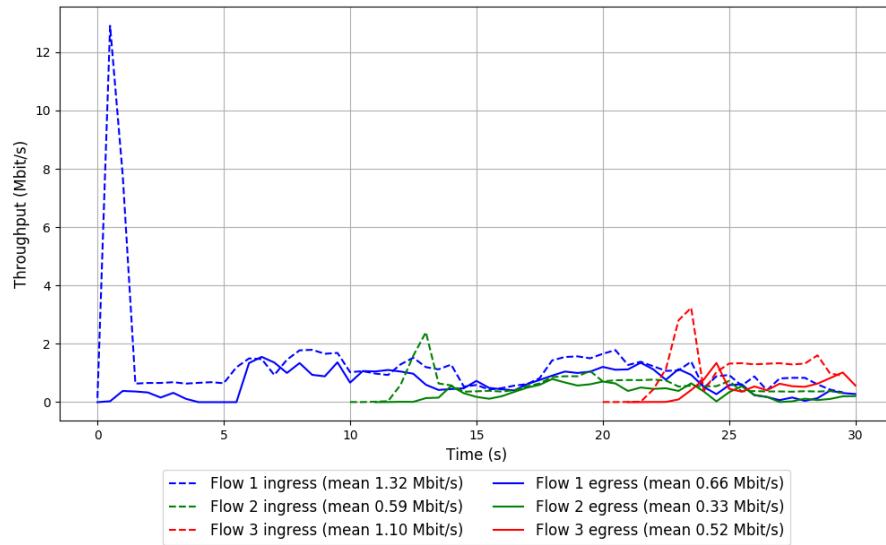


Run 2: Statistics of FillP

```
Start at: 2018-06-30 13:22:11
End at: 2018-06-30 13:22:41
Local clock offset: 8.105 ms
Remote clock offset: -10.076 ms

# Below is generated by plot.py at 2018-06-30 13:54:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 847.856 ms
Loss rate: 50.91%
-- Flow 1:
Average throughput: 0.66 Mbit/s
95th percentile per-packet one-way delay: 844.181 ms
Loss rate: 50.20%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 842.751 ms
Loss rate: 46.76%
-- Flow 3:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 862.471 ms
Loss rate: 57.92%
```

Run 2: Report of FillP — Data Link

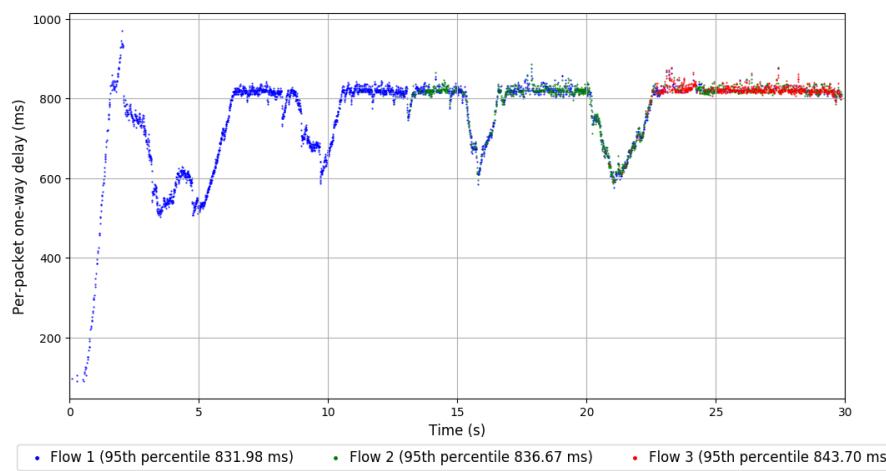
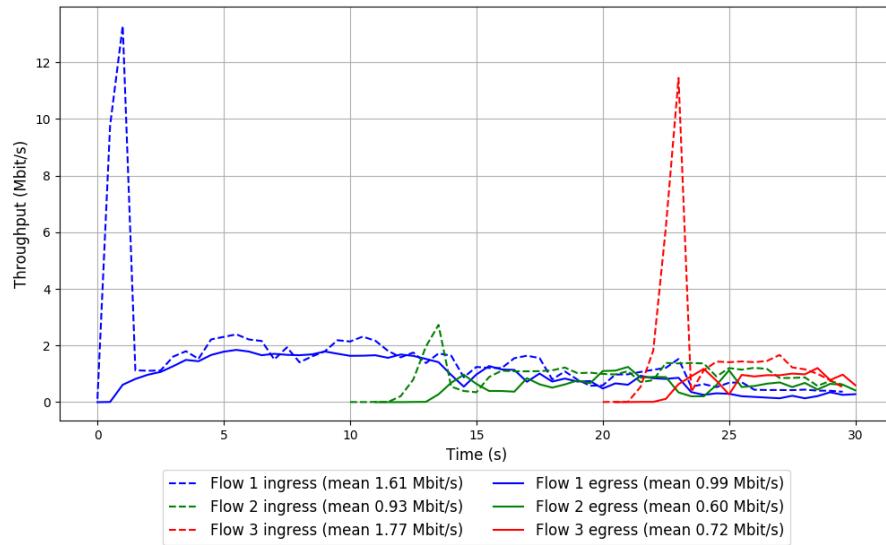


Run 3: Statistics of FillP

```
Start at: 2018-06-30 13:45:38
End at: 2018-06-30 13:46:08
Local clock offset: 9.349 ms
Remote clock offset: -9.22 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.58 Mbit/s
95th percentile per-packet one-way delay: 836.573 ms
Loss rate: 43.99%
-- Flow 1:
Average throughput: 0.99 Mbit/s
95th percentile per-packet one-way delay: 831.981 ms
Loss rate: 38.88%
-- Flow 2:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 836.673 ms
Loss rate: 39.95%
-- Flow 3:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 843.696 ms
Loss rate: 62.30%
```

Run 3: Report of FillP — Data Link

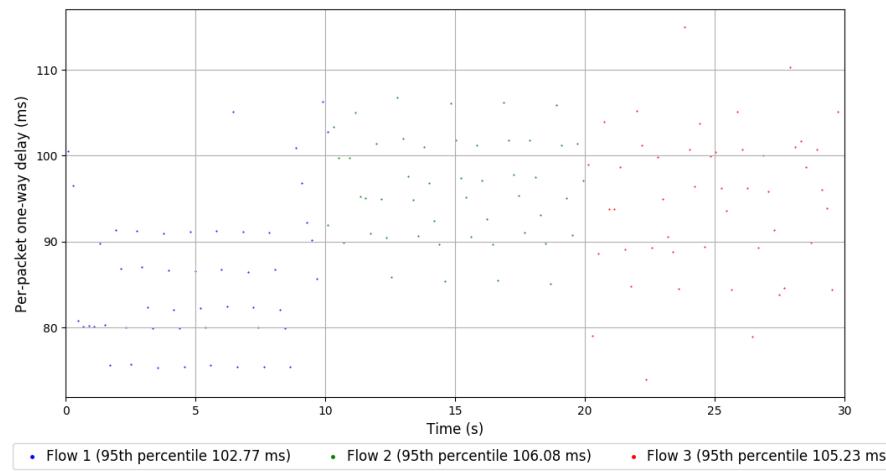
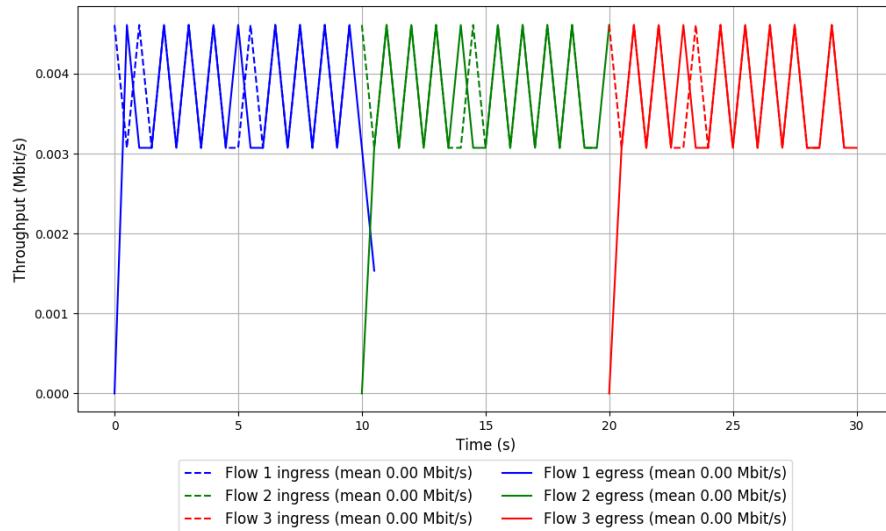


Run 1: Statistics of FillP-Sheep

```
Start at: 2018-06-30 12:53:39
End at: 2018-06-30 12:54:09
Local clock offset: 1.527 ms
Remote clock offset: -9.024 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 105.229 ms
Loss rate: 0.68%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 102.769 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 106.082 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 105.229 ms
Loss rate: 2.04%
```

Run 1: Report of FillP-Sheep — Data Link

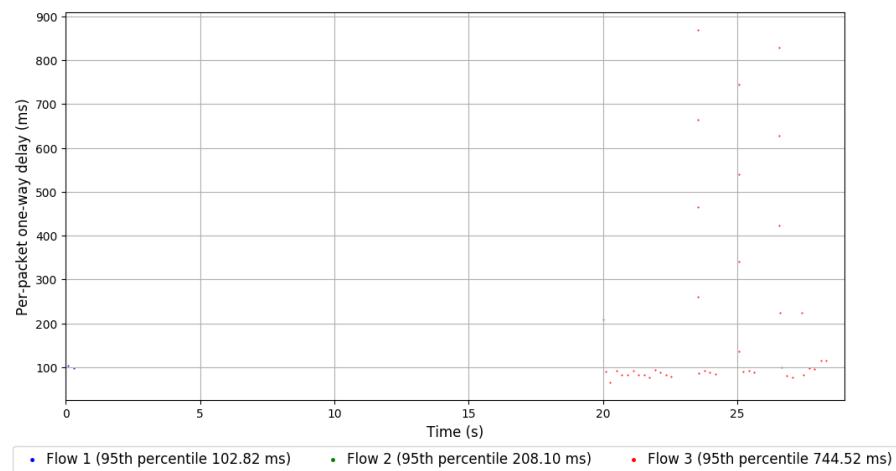
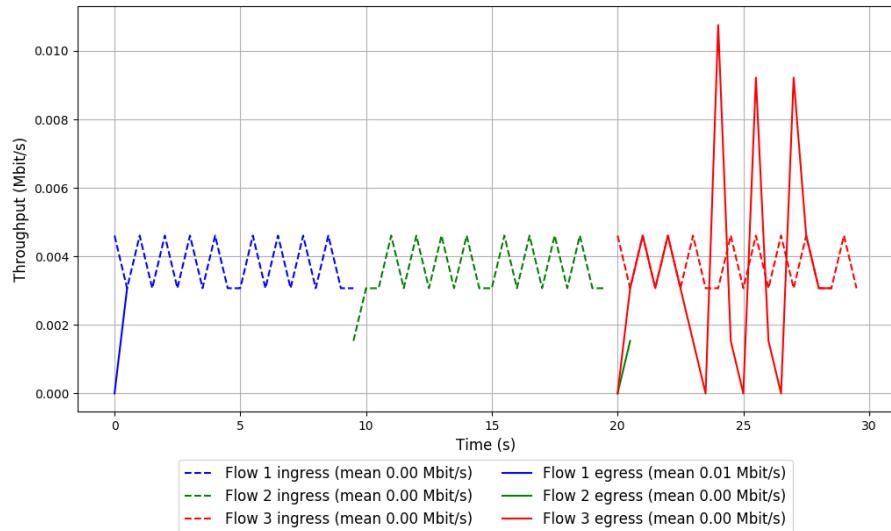


Run 2: Statistics of FillP-Sheep

```
Start at: 2018-06-30 13:18:16
End at: 2018-06-30 13:18:46
Local clock offset: 8.133 ms
Remote clock offset: -9.924 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 744.516 ms
Loss rate: 70.07%
-- Flow 1:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 102.821 ms
Loss rate: 95.92%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 208.102 ms
Loss rate: 97.96%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 744.516 ms
Loss rate: 16.33%
```

Run 2: Report of FillP-Sheep — Data Link

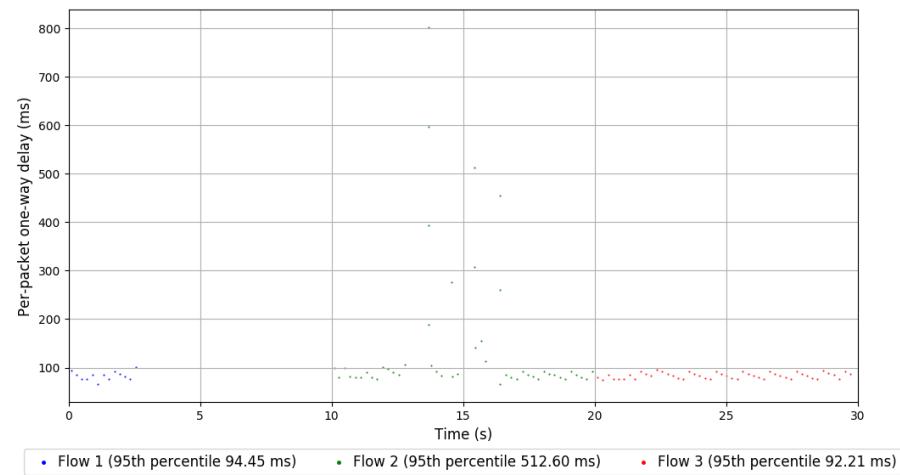
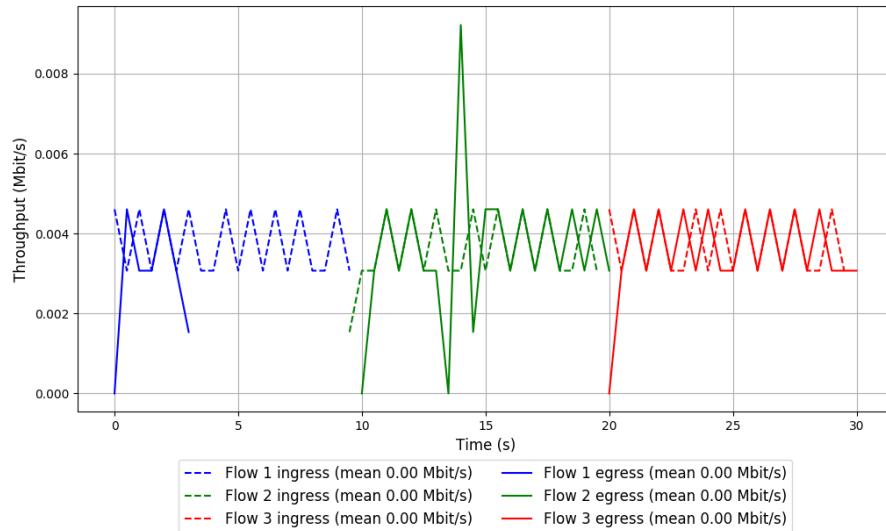


Run 3: Statistics of FillP-Sheep

```
Start at: 2018-06-30 13:41:41
End at: 2018-06-30 13:42:11
Local clock offset: 9.568 ms
Remote clock offset: -9.196 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 308.155 ms
Loss rate: 25.17%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 94.447 ms
Loss rate: 73.47%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 512.597 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 92.212 ms
Loss rate: 2.04%
```

Run 3: Report of FillP-Sheep — Data Link

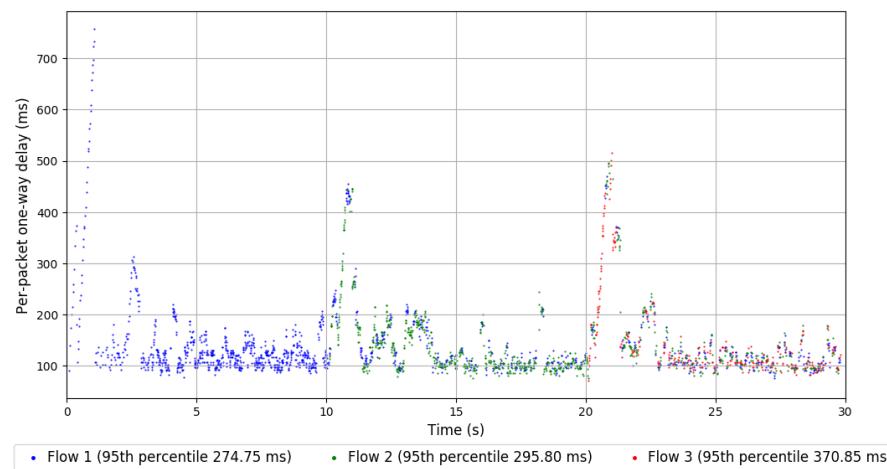
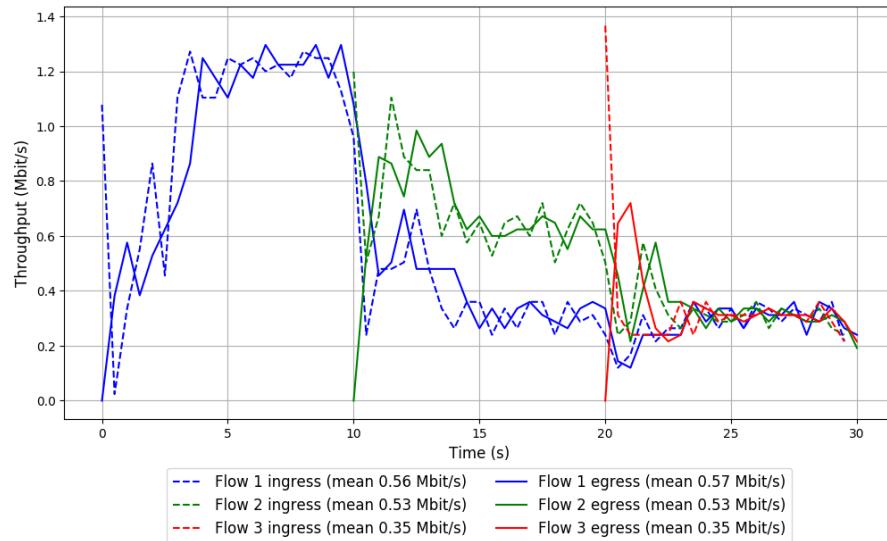


Run 1: Statistics of Indigo

```
Start at: 2018-06-30 12:59:00
End at: 2018-06-30 12:59:30
Local clock offset: 4.541 ms
Remote clock offset: -9.483 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.03 Mbit/s
95th percentile per-packet one-way delay: 325.879 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 274.751 ms
Loss rate: 0.29%
-- Flow 2:
Average throughput: 0.53 Mbit/s
95th percentile per-packet one-way delay: 295.796 ms
Loss rate: 0.58%
-- Flow 3:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 370.854 ms
Loss rate: 1.38%
```

Run 1: Report of Indigo — Data Link

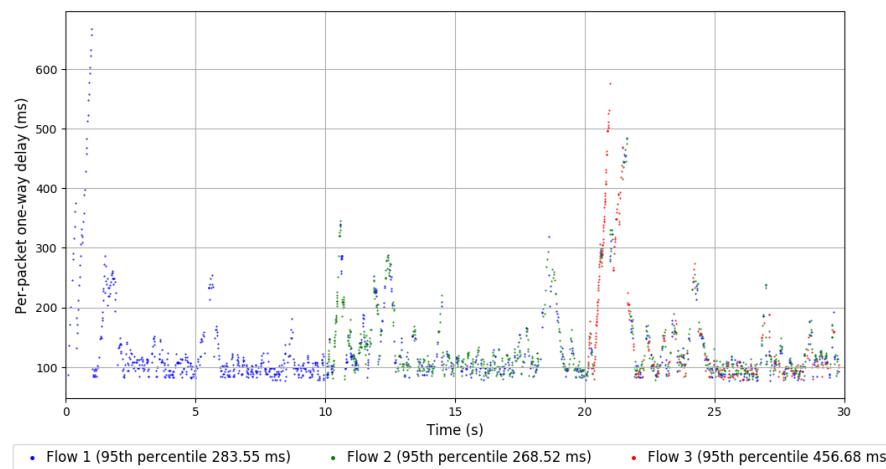
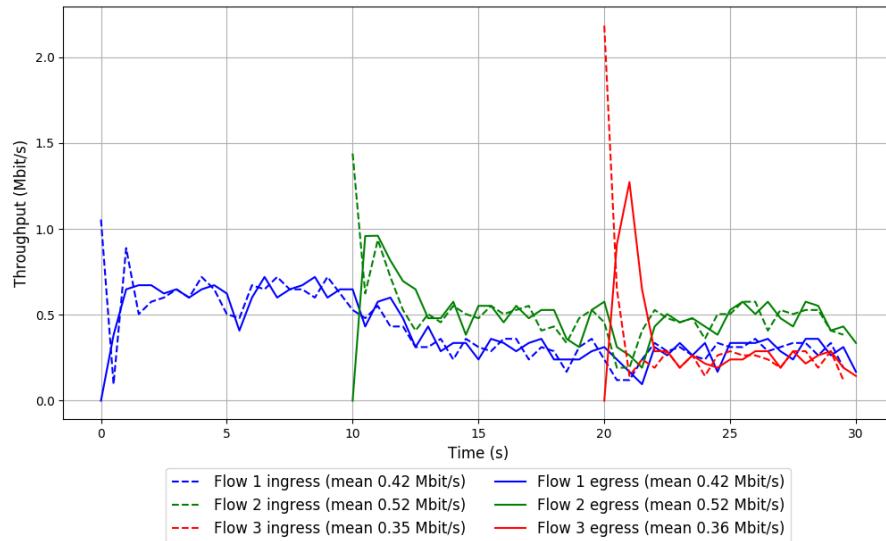


Run 2: Statistics of Indigo

```
Start at: 2018-06-30 13:23:36
End at: 2018-06-30 13:24:06
Local clock offset: 8.423 ms
Remote clock offset: -10.052 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.88 Mbit/s
95th percentile per-packet one-way delay: 314.220 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 283.551 ms
Loss rate: 0.48%
-- Flow 2:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 268.520 ms
Loss rate: 0.94%
-- Flow 3:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 456.676 ms
Loss rate: 1.03%
```

Run 2: Report of Indigo — Data Link

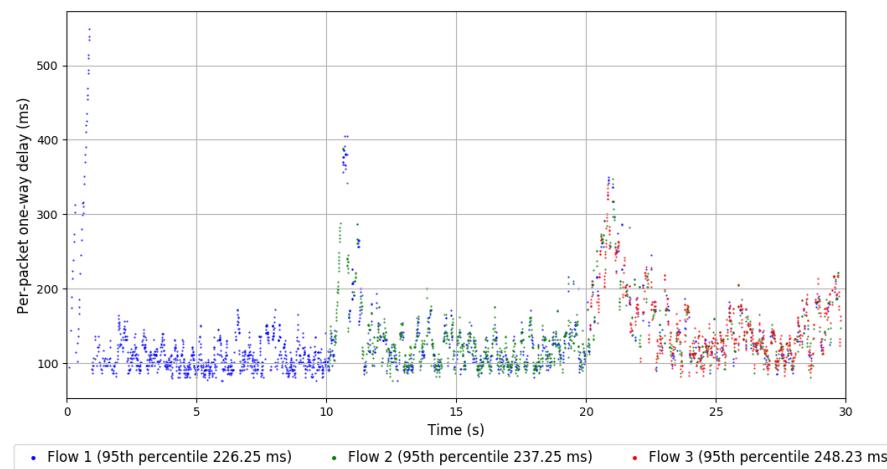
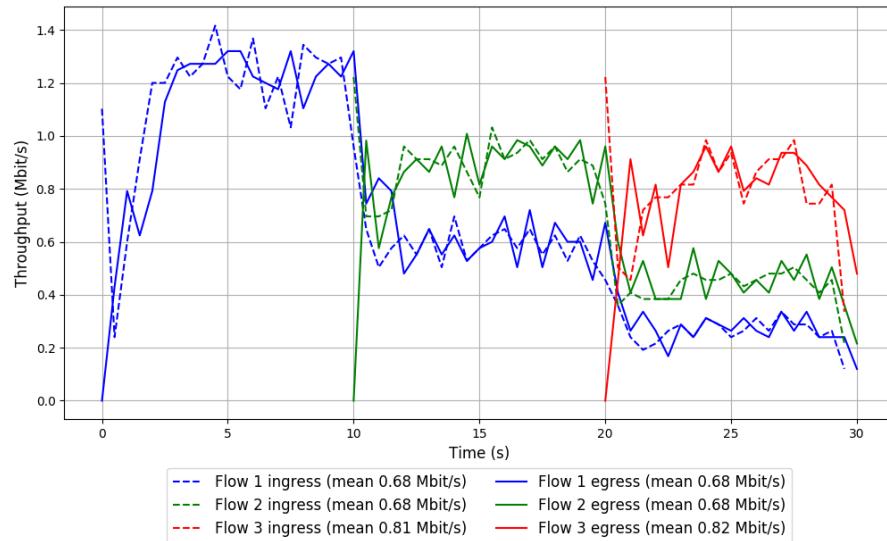


Run 3: Statistics of Indigo

```
Start at: 2018-06-30 13:47:04
End at: 2018-06-30 13:47:34
Local clock offset: 8.161 ms
Remote clock offset: -9.121 ms

# Below is generated by plot.py at 2018-06-30 13:55:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 241.682 ms
Loss rate: 0.52%
-- Flow 1:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 226.246 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 237.254 ms
Loss rate: 0.63%
-- Flow 3:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 248.234 ms
Loss rate: 0.91%
```

Run 3: Report of Indigo — Data Link

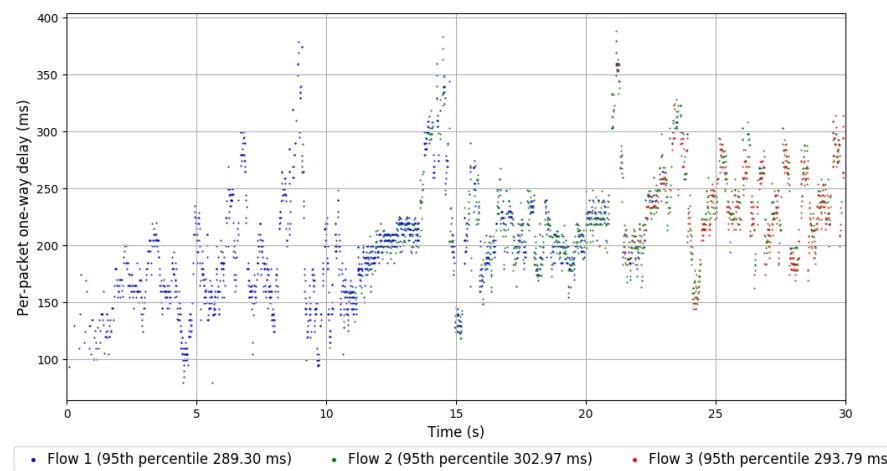
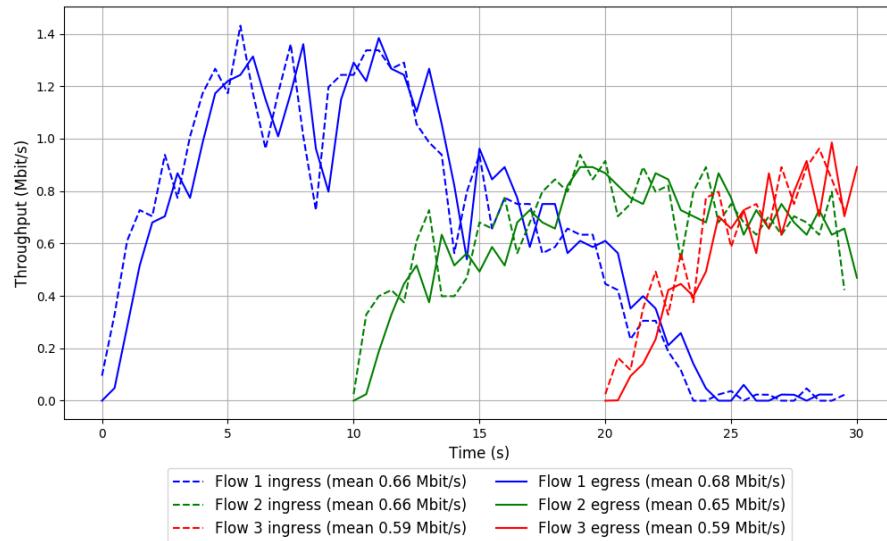


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2018-06-30 13:03:02
End at: 2018-06-30 13:03:32
Local clock offset: 5.856 ms
Remote clock offset: -9.575 ms

# Below is generated by plot.py at 2018-06-30 13:55:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 297.813 ms
Loss rate: 1.04%
-- Flow 1:
Average throughput: 0.68 Mbit/s
95th percentile per-packet one-way delay: 289.304 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 302.966 ms
Loss rate: 1.43%
-- Flow 3:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 293.786 ms
Loss rate: 3.39%
```

Run 1: Report of LEDBAT — Data Link

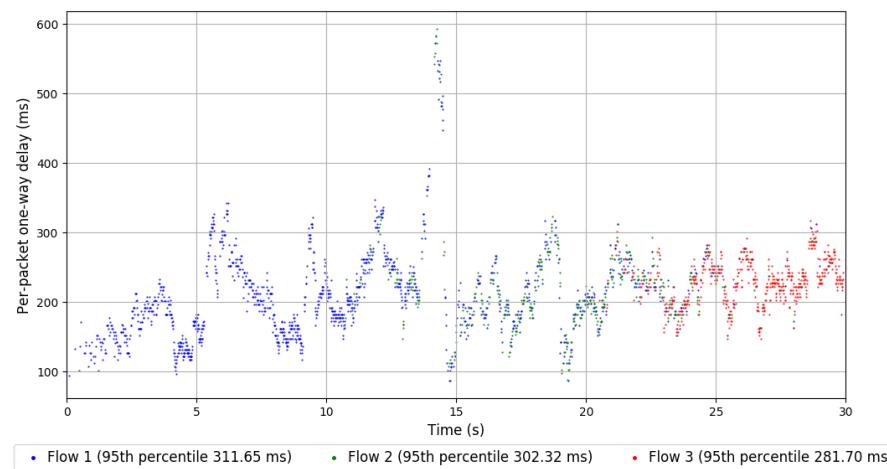
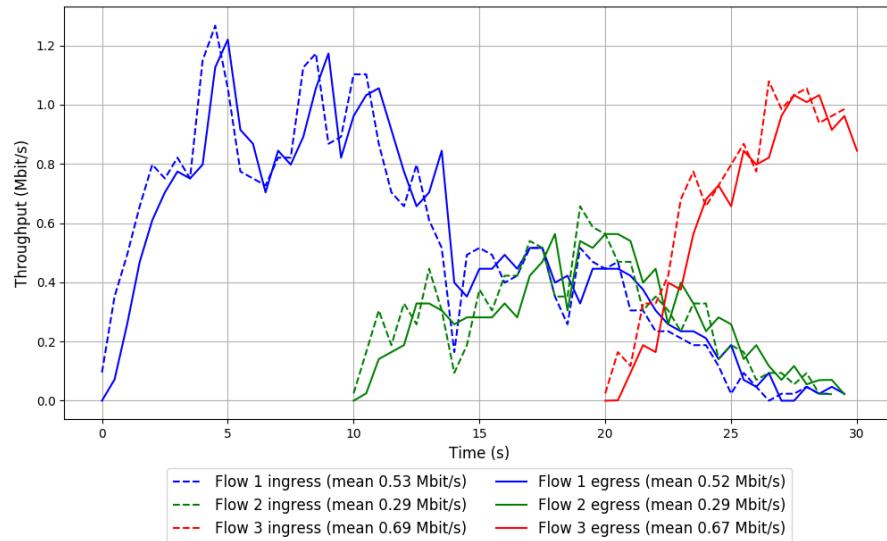


Run 2: Statistics of LEDBAT

```
Start at: 2018-06-30 13:27:35
End at: 2018-06-30 13:28:05
Local clock offset: 8.492 ms
Remote clock offset: -10.001 ms

# Below is generated by plot.py at 2018-06-30 13:55:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 301.614 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 311.649 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 302.316 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.67 Mbit/s
95th percentile per-packet one-way delay: 281.697 ms
Loss rate: 4.62%
```

Run 2: Report of LEDBAT — Data Link

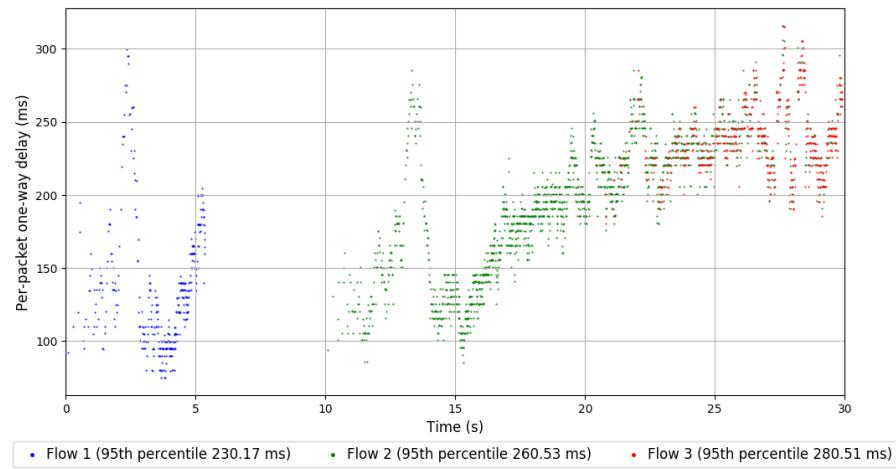
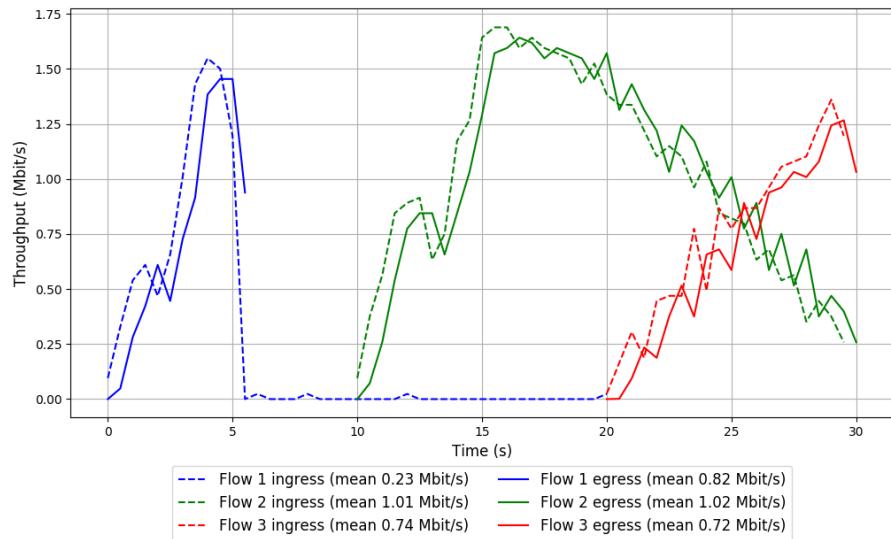


Run 3: Statistics of LEDBAT

```
Start at: 2018-06-30 13:51:06
End at: 2018-06-30 13:51:36
Local clock offset: 5.304 ms
Remote clock offset: -8.995 ms

# Below is generated by plot.py at 2018-06-30 13:55:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 265.648 ms
Loss rate: 2.76%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 230.169 ms
Loss rate: 8.41%
-- Flow 2:
Average throughput: 1.02 Mbit/s
95th percentile per-packet one-way delay: 260.534 ms
Loss rate: 0.41%
-- Flow 3:
Average throughput: 0.72 Mbit/s
95th percentile per-packet one-way delay: 280.508 ms
Loss rate: 5.58%
```

Run 3: Report of LEDBAT — Data Link

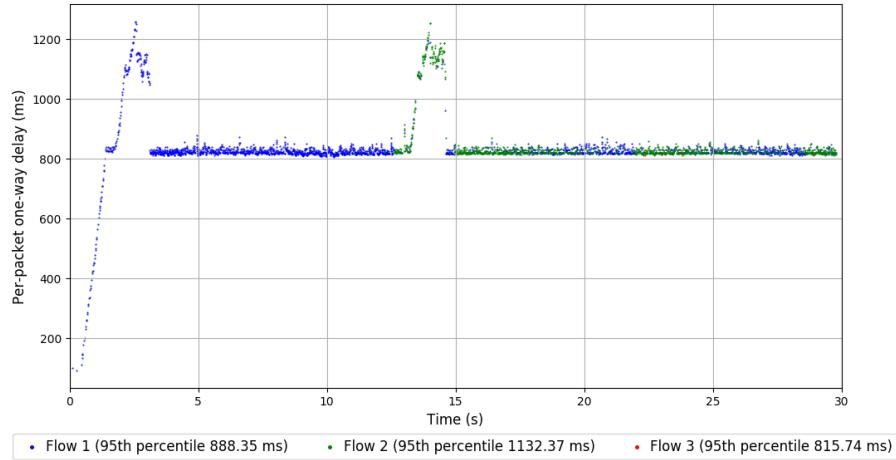
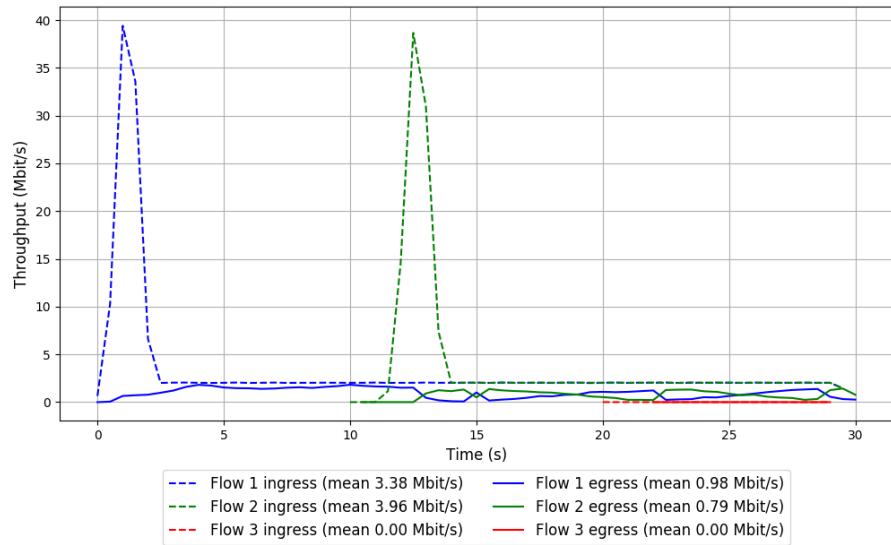


```
Run 1: Statistics of PCC-Allegro
```

```
Start at: 2018-06-30 13:04:22
End at: 2018-06-30 13:04:52
Local clock offset: 6.278 ms
Remote clock offset: -9.659 ms

# Below is generated by plot.py at 2018-06-30 13:55:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 1082.032 ms
Loss rate: 75.35%
-- Flow 1:
Average throughput: 0.98 Mbit/s
95th percentile per-packet one-way delay: 888.351 ms
Loss rate: 71.02%
-- Flow 2:
Average throughput: 0.79 Mbit/s
95th percentile per-packet one-way delay: 1132.368 ms
Loss rate: 80.90%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 815.735 ms
Loss rate: 83.46%
```

Run 1: Report of PCC-Allegro — Data Link

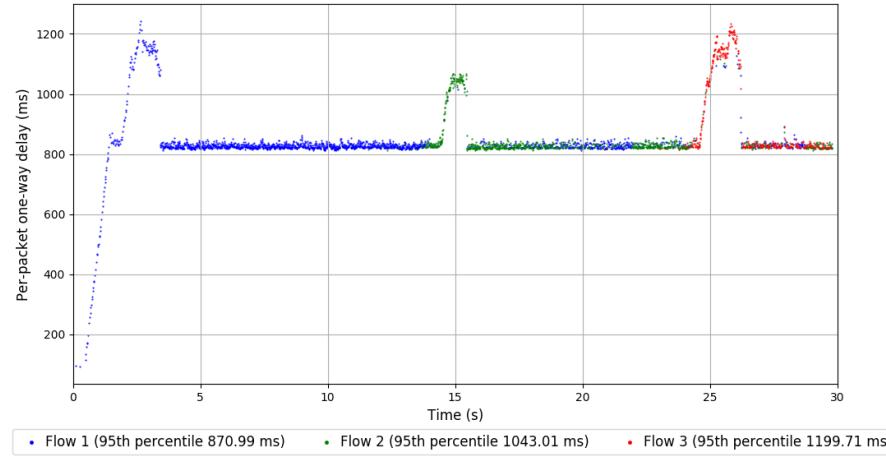
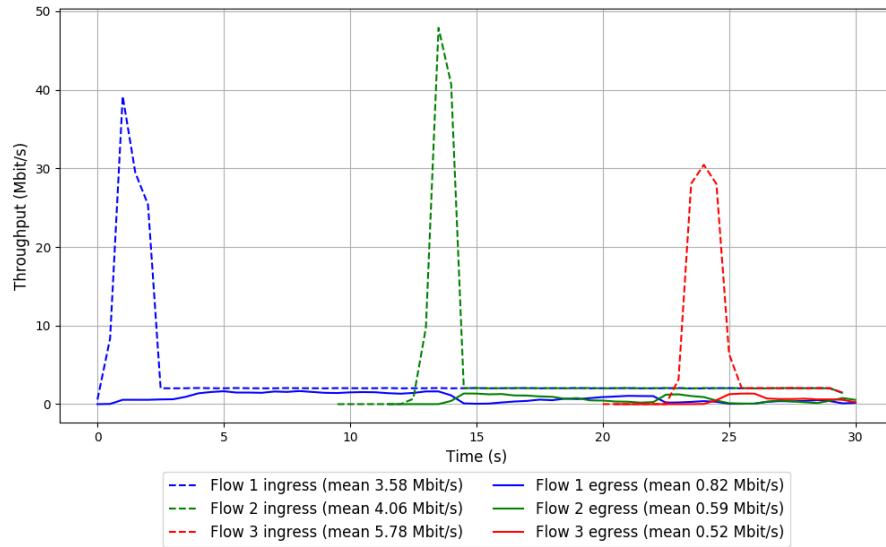


Run 2: Statistics of PCC-Allegro

```
Start at: 2018-06-30 13:28:55
End at: 2018-06-30 13:29:25
Local clock offset: 8.44 ms
Remote clock offset: -10.022 ms

# Below is generated by plot.py at 2018-06-30 13:55:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 1113.589 ms
Loss rate: 83.76%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 870.990 ms
Loss rate: 77.28%
-- Flow 2:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1043.007 ms
Loss rate: 86.61%
-- Flow 3:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 1199.707 ms
Loss rate: 91.91%
```

Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

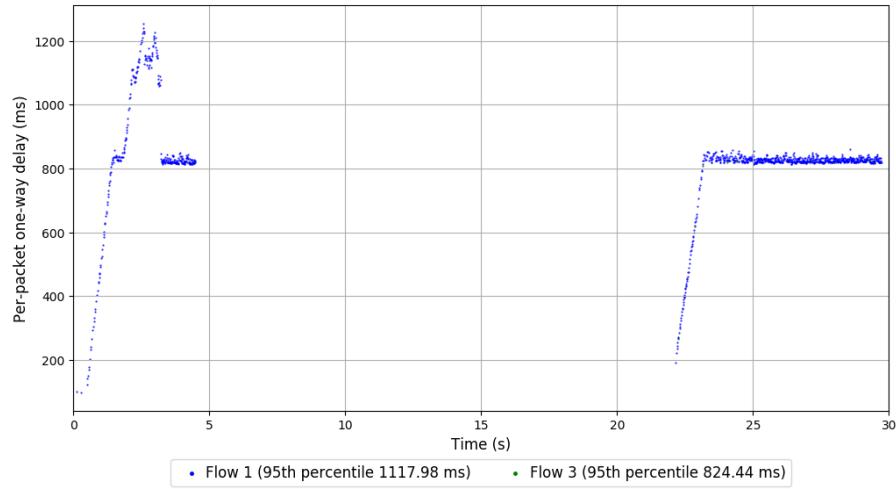
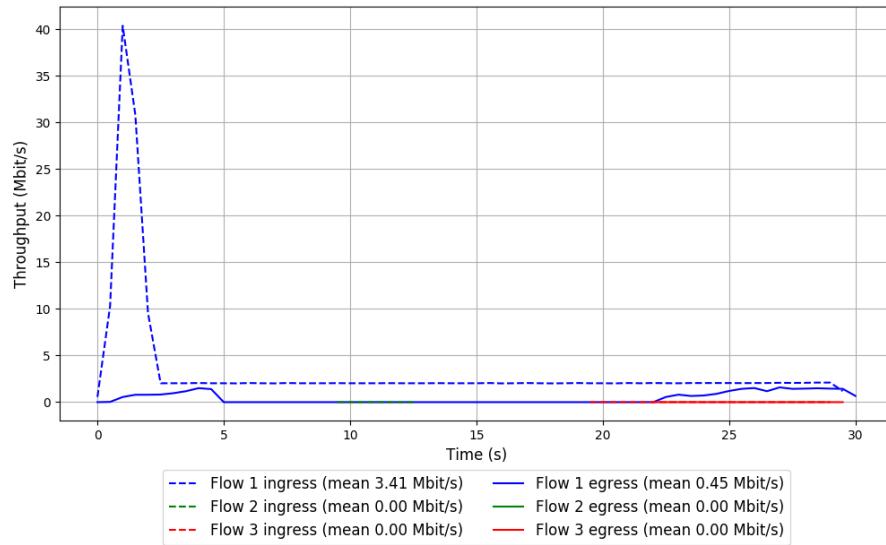
Start at: 2018-06-30 13:52:27

End at: 2018-06-30 13:52:57

Local clock offset: 4.486 ms

Remote clock offset: -8.901 ms

Run 3: Report of PCC-Allegro — Data Link

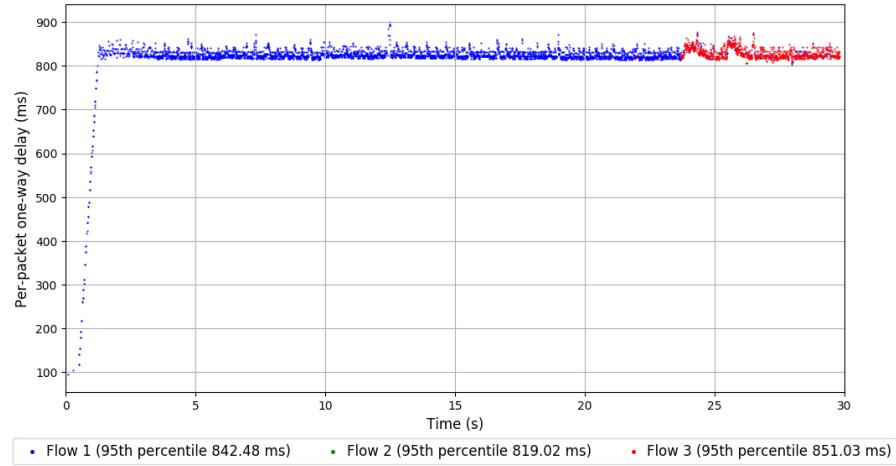
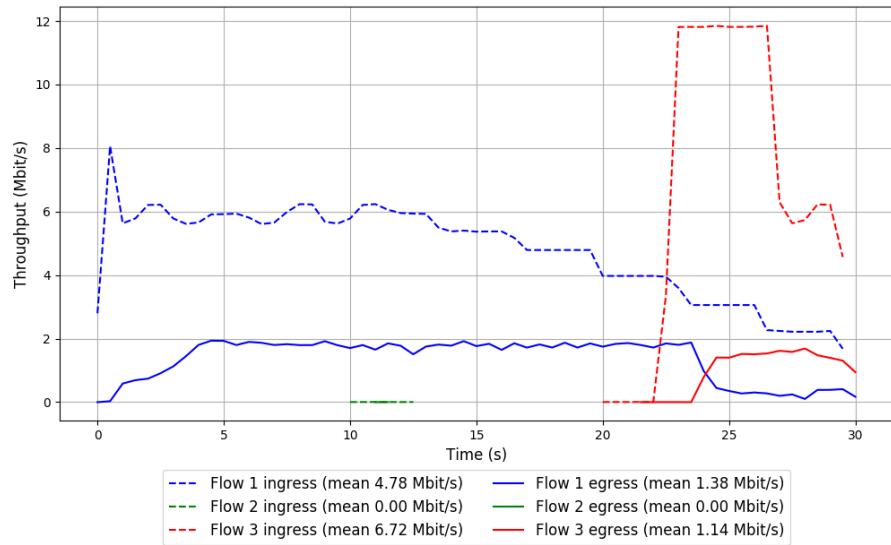


Run 1: Statistics of PCC-Expr

```
Start at: 2018-06-30 12:43:30
End at: 2018-06-30 12:44:00
Local clock offset: -6.27 ms
Remote clock offset: -9.416 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.69 Mbit/s
95th percentile per-packet one-way delay: 844.900 ms
Loss rate: 76.04%
-- Flow 1:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 842.478 ms
Loss rate: 71.28%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 819.023 ms
Loss rate: 92.31%
-- Flow 3:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 851.026 ms
Loss rate: 86.30%
```

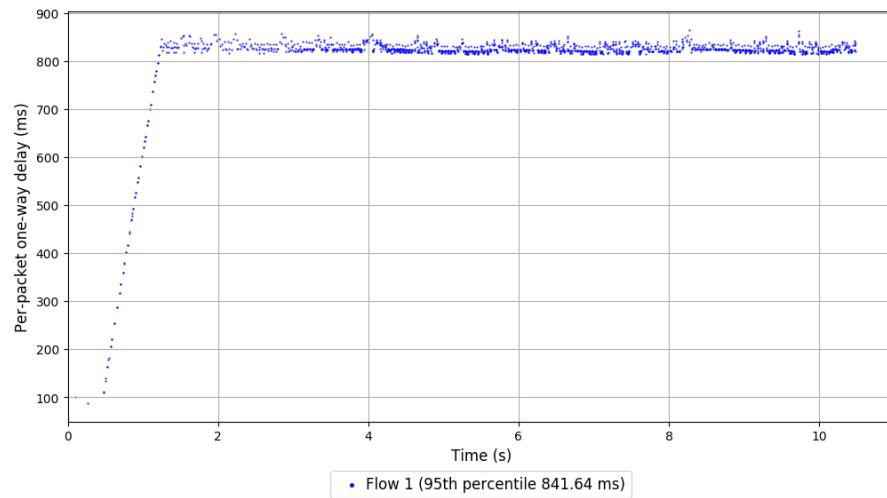
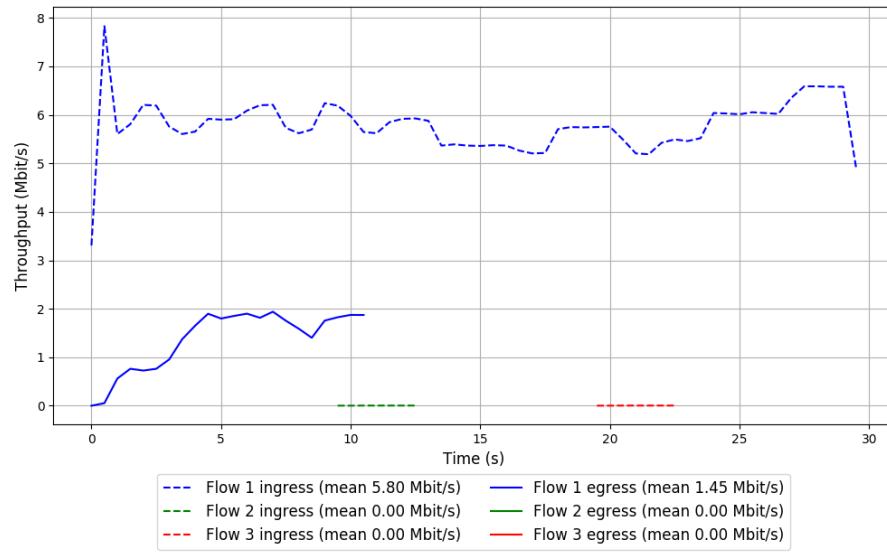
Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

Start at: 2018-06-30 13:09:00
End at: 2018-06-30 13:09:30
Local clock offset: 7.065 ms
Remote clock offset: -9.705 ms

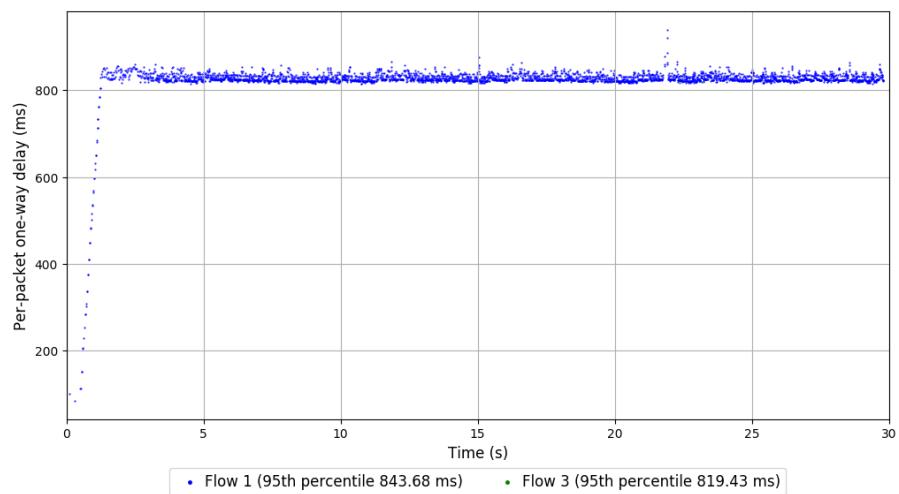
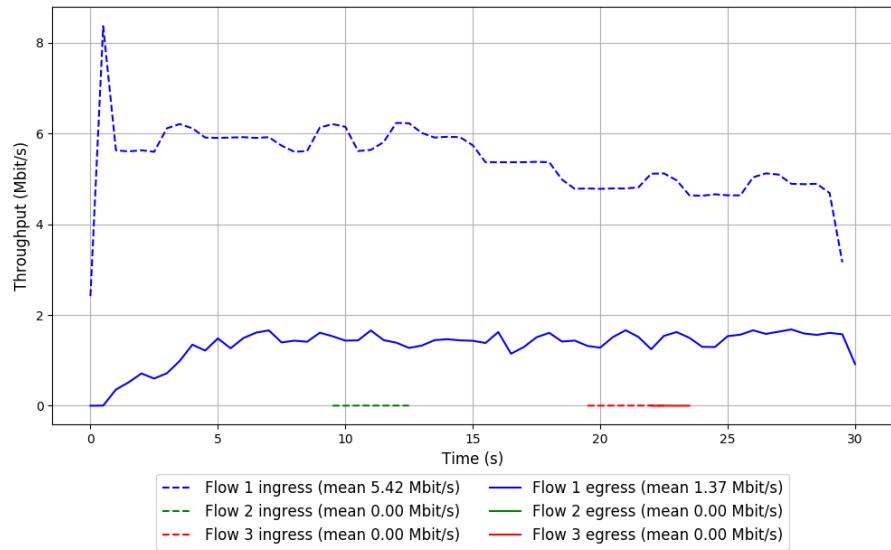
Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-06-30 13:33:07
End at: 2018-06-30 13:33:37
Local clock offset: 8.841 ms
Remote clock offset: -10.076 ms

Run 3: Report of PCC-Expr — Data Link

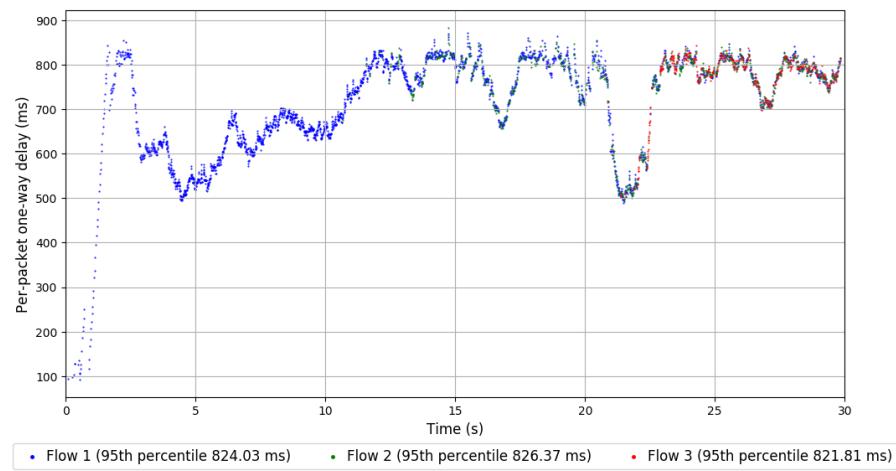
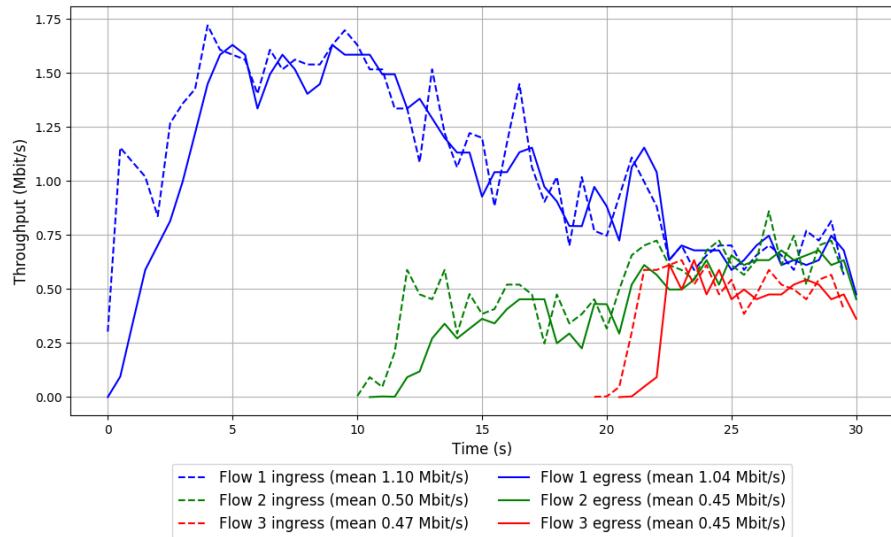


Run 1: Statistics of QUIC Cubic

```
Start at: 2018-06-30 12:46:07
End at: 2018-06-30 12:46:37
Local clock offset: -6.336 ms
Remote clock offset: -9.116 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.46 Mbit/s
95th percentile per-packet one-way delay: 824.744 ms
Loss rate: 8.64%
-- Flow 1:
Average throughput: 1.04 Mbit/s
95th percentile per-packet one-way delay: 824.032 ms
Loss rate: 6.23%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 826.371 ms
Loss rate: 14.70%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 821.809 ms
Loss rate: 12.58%
```

Run 1: Report of QUIC Cubic — Data Link

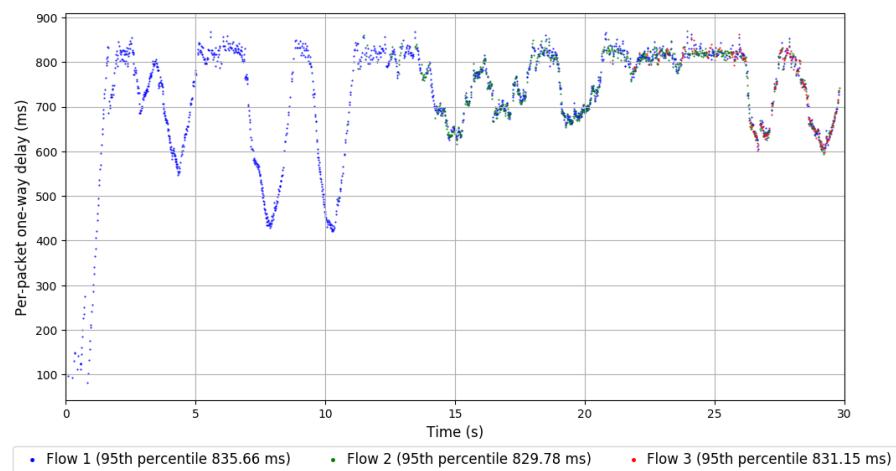
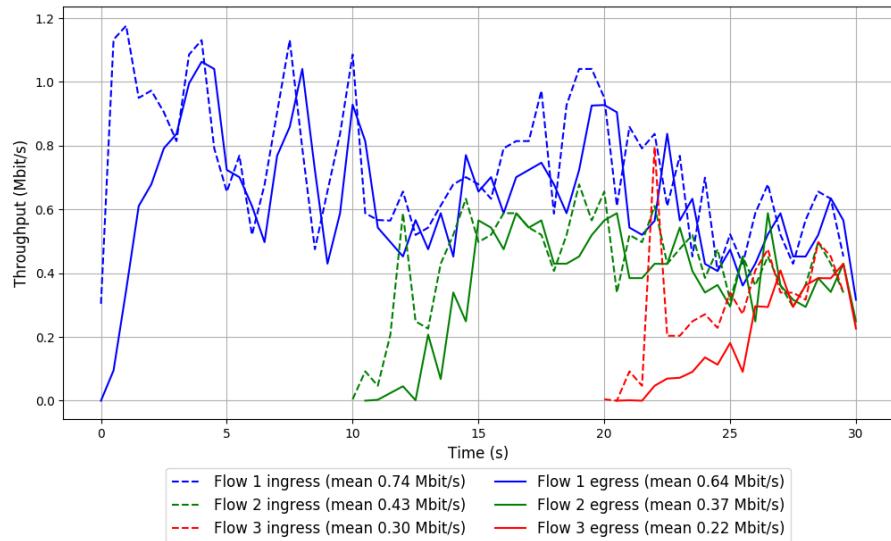


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-06-30 13:10:34
End at: 2018-06-30 13:11:04
Local clock offset: 7.293 ms
Remote clock offset: -9.756 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 833.230 ms
Loss rate: 15.73%
-- Flow 1:
Average throughput: 0.64 Mbit/s
95th percentile per-packet one-way delay: 835.662 ms
Loss rate: 13.17%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 829.784 ms
Loss rate: 16.05%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 831.148 ms
Loss rate: 33.94%
```

Run 2: Report of QUIC Cubic — Data Link

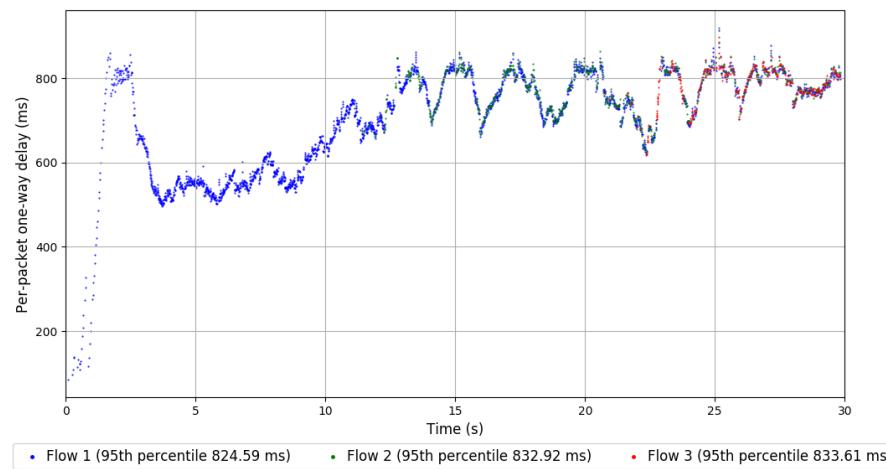
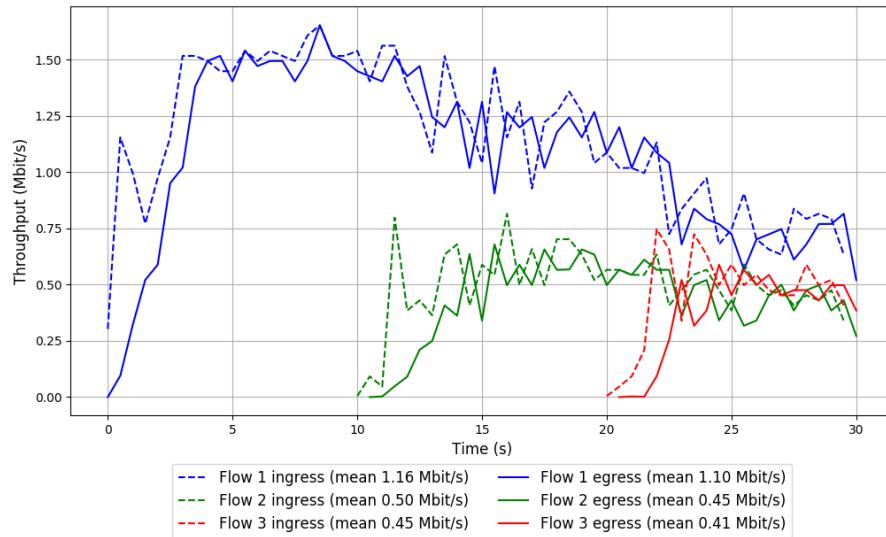


Run 3: Statistics of QUIC Cubic

```
Start at: 2018-06-30 13:34:39
End at: 2018-06-30 13:35:09
Local clock offset: 8.823 ms
Remote clock offset: -10.108 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.51 Mbit/s
95th percentile per-packet one-way delay: 827.473 ms
Loss rate: 8.32%
-- Flow 1:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 824.585 ms
Loss rate: 5.83%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 832.917 ms
Loss rate: 13.02%
-- Flow 3:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 833.614 ms
Loss rate: 17.15%
```

Run 3: Report of QUIC Cubic — Data Link

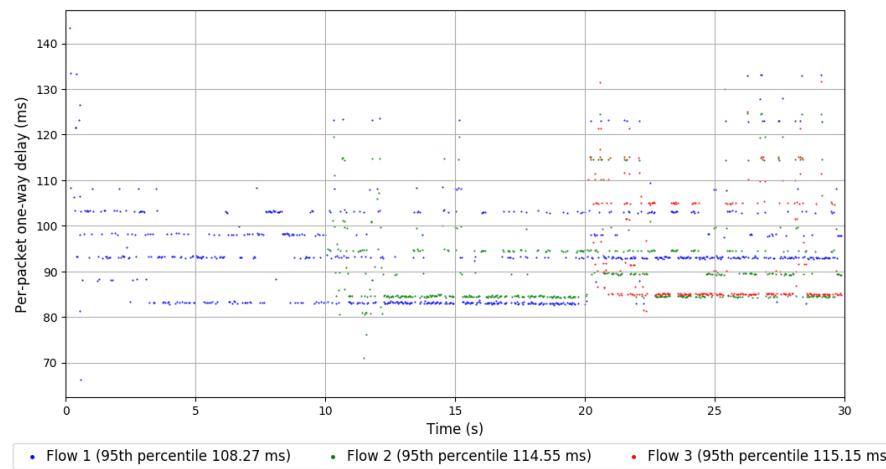
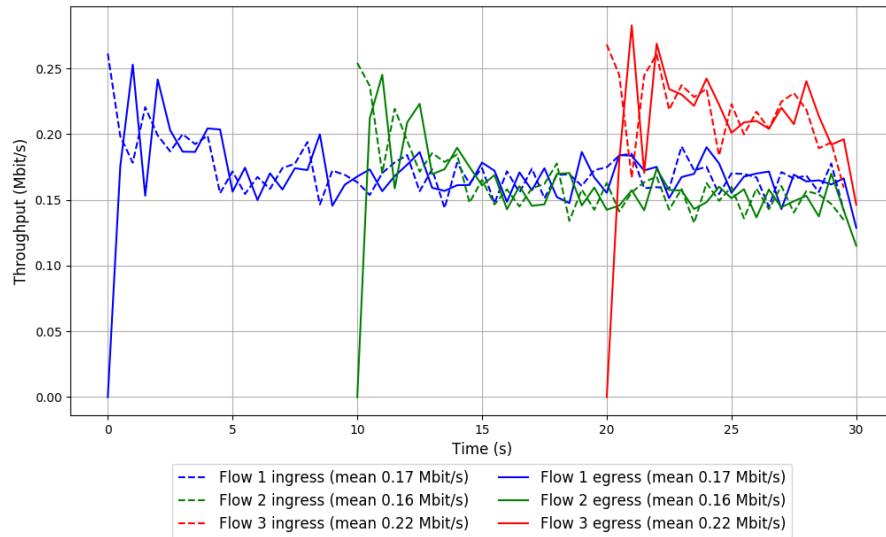


```
Run 1: Statistics of SCReAM
```

```
Start at: 2018-06-30 12:54:57
End at: 2018-06-30 12:55:27
Local clock offset: 2.489 ms
Remote clock offset: -9.481 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 114.633 ms
Loss rate: 0.74%
-- Flow 1:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 108.269 ms
Loss rate: 0.50%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 114.552 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 115.147 ms
Loss rate: 1.27%
```

Run 1: Report of SCReAM — Data Link

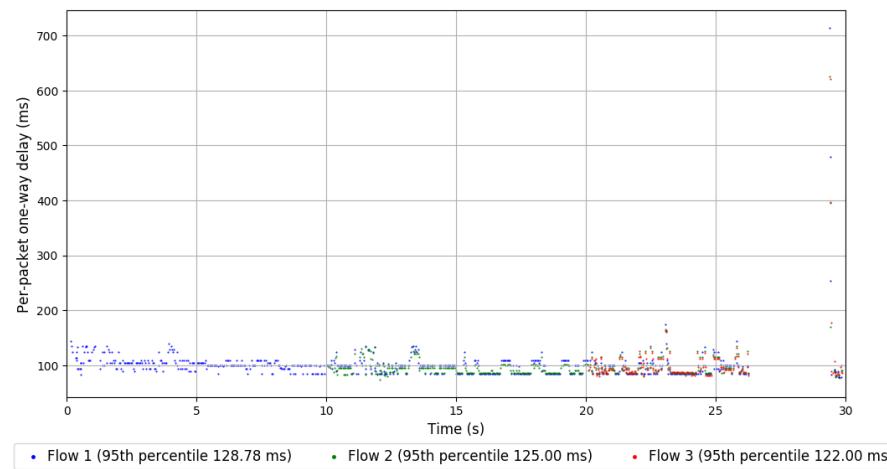
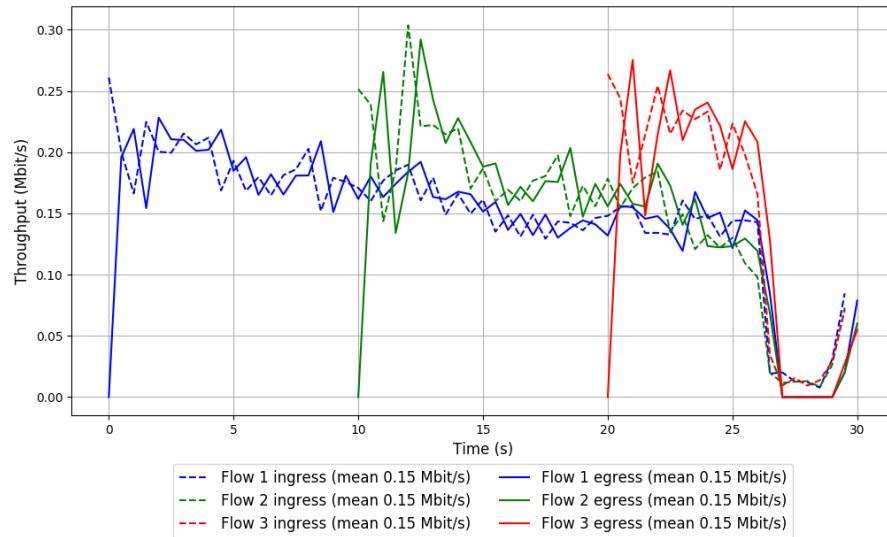


Run 2: Statistics of SCReAM

```
Start at: 2018-06-30 13:19:34
End at: 2018-06-30 13:20:04
Local clock offset: 8.181 ms
Remote clock offset: -9.955 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 125.214 ms
Loss rate: 2.68%
-- Flow 1:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 128.775 ms
Loss rate: 1.90%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 124.995 ms
Loss rate: 2.26%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 121.999 ms
Loss rate: 5.82%
```

Run 2: Report of SCReAM — Data Link

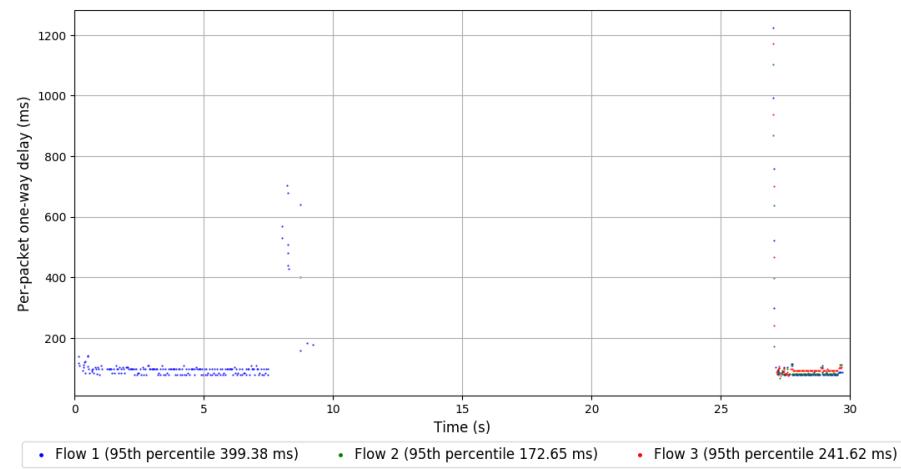
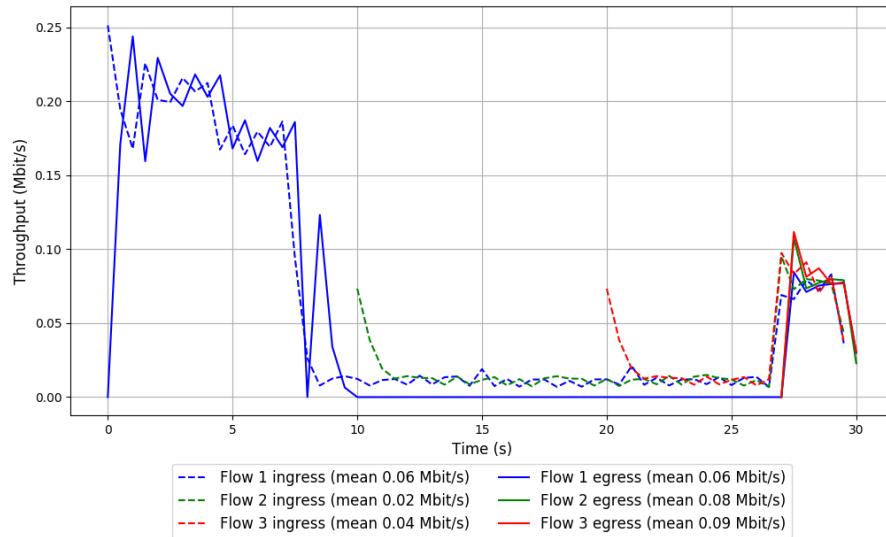


Run 3: Statistics of SCReAM

```
Start at: 2018-06-30 13:42:59
End at: 2018-06-30 13:43:29
Local clock offset: 9.428 ms
Remote clock offset: -9.367 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 397.680 ms
Loss rate: 20.56%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 399.385 ms
Loss rate: 10.02%
-- Flow 2:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 172.648 ms
Loss rate: 52.62%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 241.622 ms
Loss rate: 35.71%
```

Run 3: Report of SCReAM — Data Link

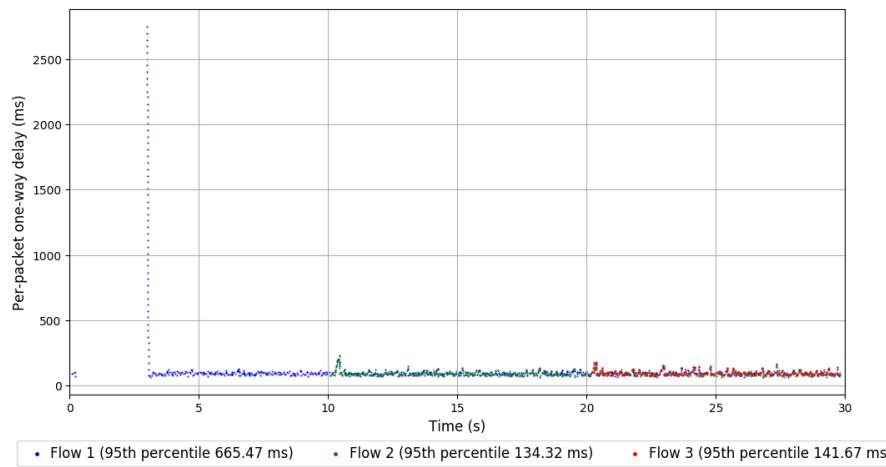
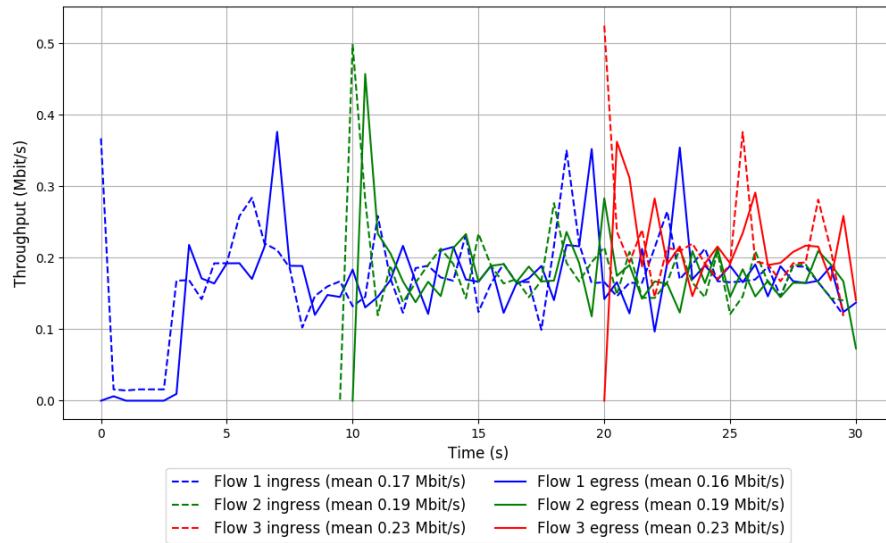


Run 1: Statistics of Sprout

```
Start at: 2018-06-30 13:00:21
End at: 2018-06-30 13:00:51
Local clock offset: 4.998 ms
Remote clock offset: -9.286 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 151.649 ms
Loss rate: 2.25%
-- Flow 1:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 665.470 ms
Loss rate: 3.71%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 134.321 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 141.666 ms
Loss rate: 1.06%
```

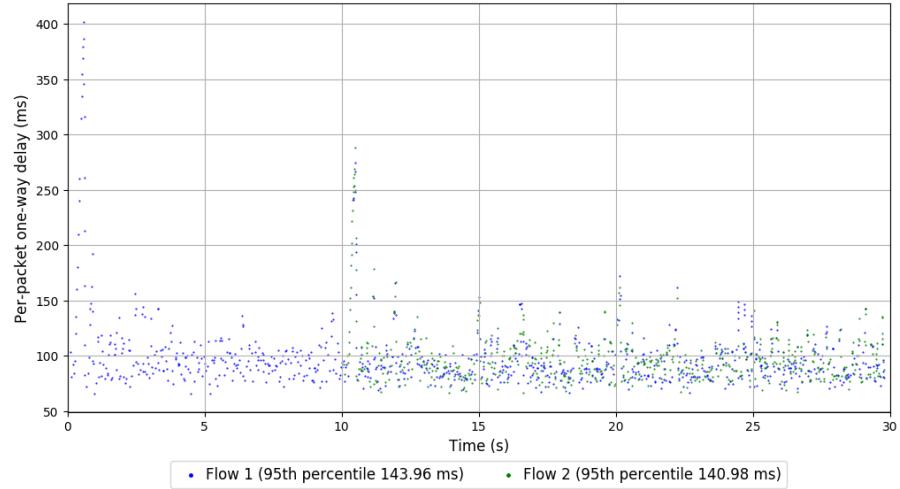
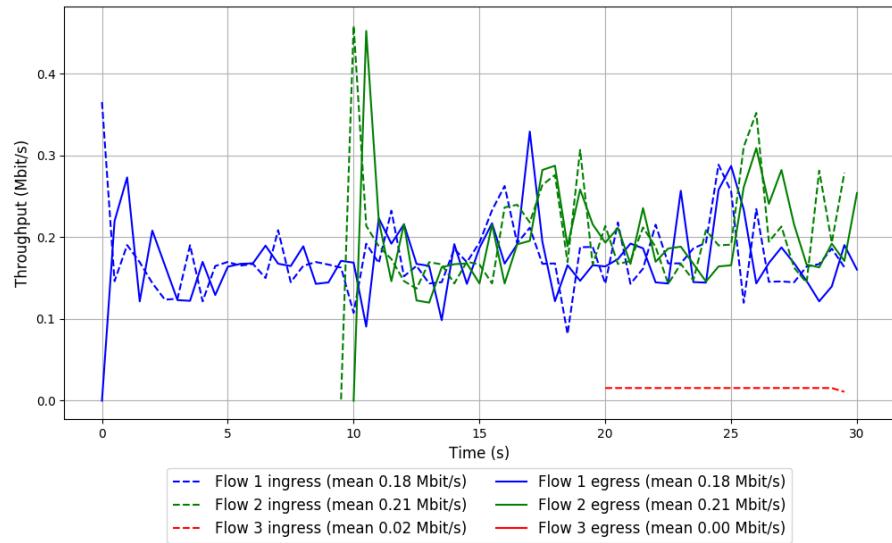
Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2018-06-30 13:24:56
End at: 2018-06-30 13:25:26
Local clock offset: 8.521 ms
Remote clock offset: -10.123 ms

Run 2: Report of Sprout — Data Link

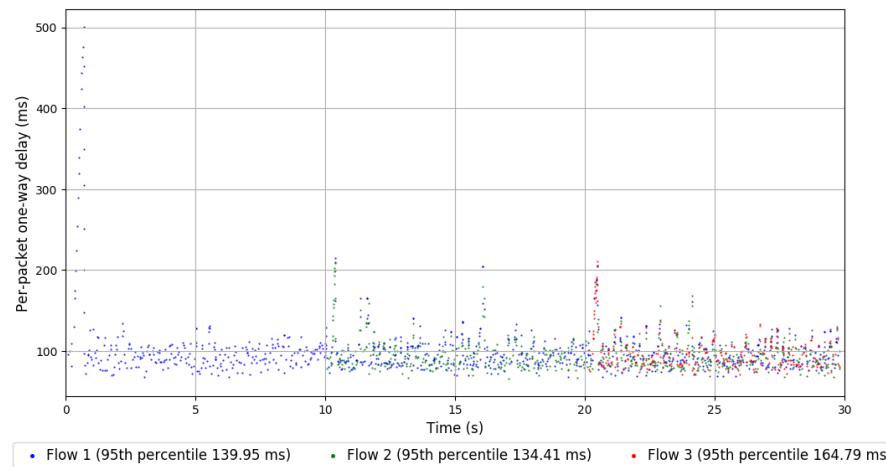
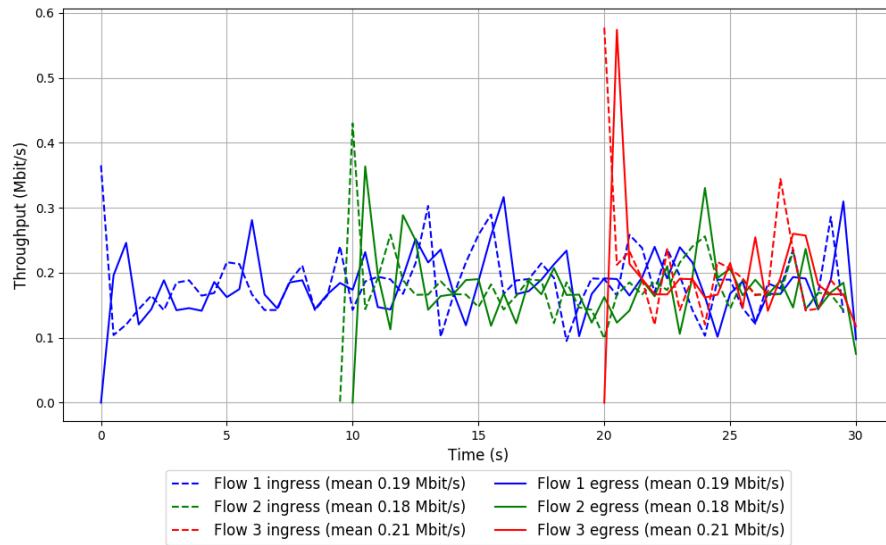


Run 3: Statistics of Sprout

```
Start at: 2018-06-30 13:48:26
End at: 2018-06-30 13:48:56
Local clock offset: 6.931 ms
Remote clock offset: -9.014 ms

# Below is generated by plot.py at 2018-06-30 13:55:15
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 137.941 ms
Loss rate: 0.82%
-- Flow 1:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 139.947 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 134.409 ms
Loss rate: 0.95%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 164.787 ms
Loss rate: 1.73%
```

Run 3: Report of Sprout — Data Link

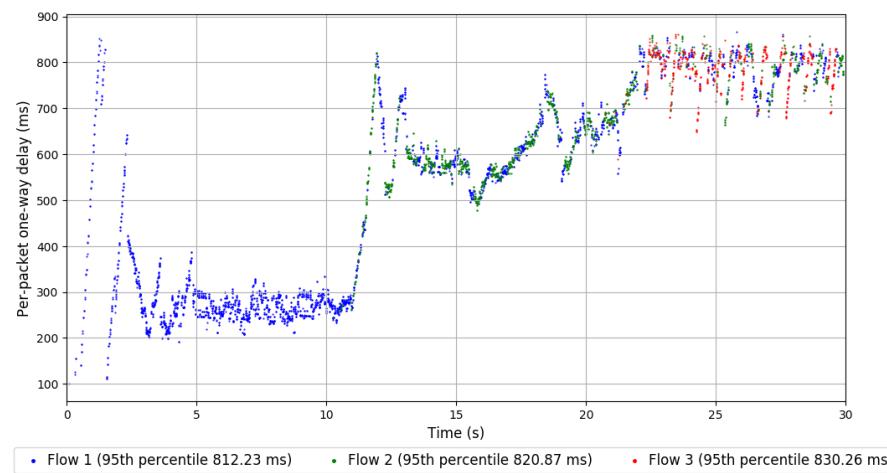
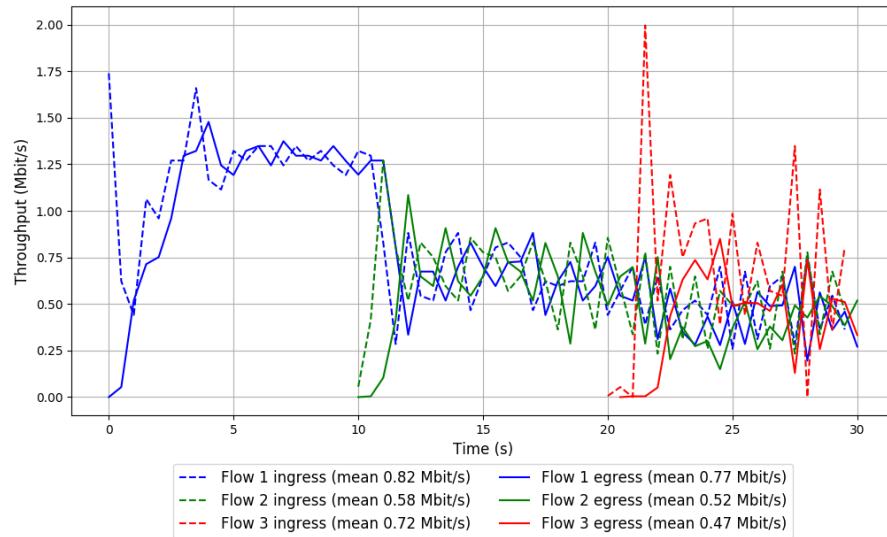


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-06-30 12:51:30
End at: 2018-06-30 12:52:00
Local clock offset: 0.121 ms
Remote clock offset: -9.159 ms

# Below is generated by plot.py at 2018-06-30 13:55:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.25 Mbit/s
95th percentile per-packet one-way delay: 818.964 ms
Loss rate: 13.03%
-- Flow 1:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 812.225 ms
Loss rate: 6.24%
-- Flow 2:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 820.870 ms
Loss rate: 11.82%
-- Flow 3:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 830.259 ms
Loss rate: 39.08%
```

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



Run 2: Statistics of TaoVA-100x

/home/ubuntu/pantheon/data/2018-06-30T12-41-China-ppp0-to-AWS-Korea-3-runs-3-flows/taova_st

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

Figure is missing

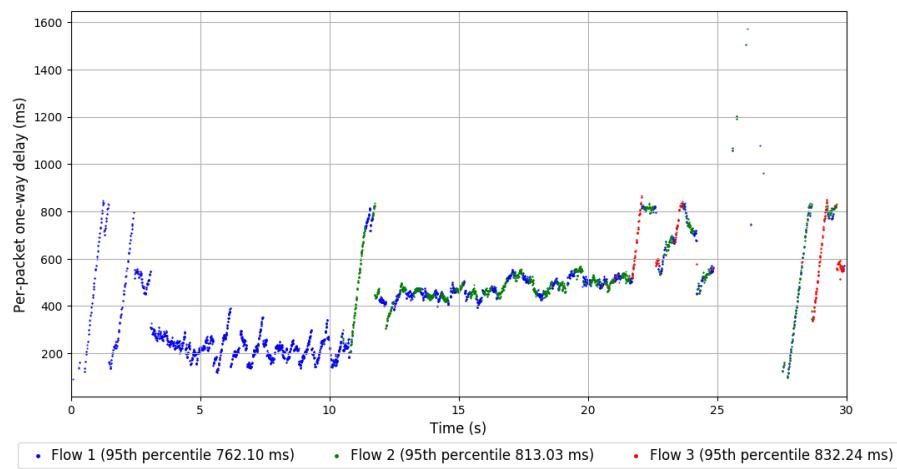
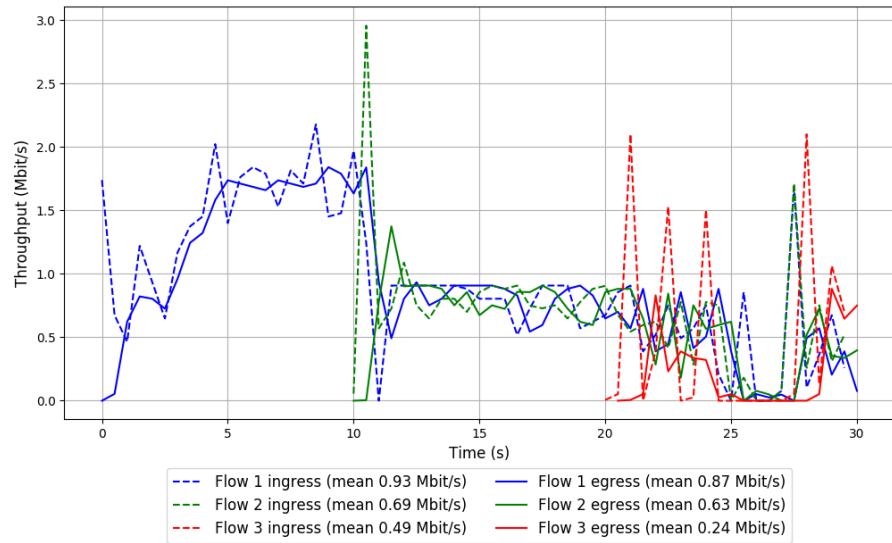
Figure is missing

Run 3: Statistics of TaoVA-100x

```
Start at: 2018-06-30 13:40:03
End at: 2018-06-30 13:40:33
Local clock offset: 9.447 ms
Remote clock offset: -9.35 ms

# Below is generated by plot.py at 2018-06-30 13:55:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.36 Mbit/s
95th percentile per-packet one-way delay: 795.036 ms
Loss rate: 12.69%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 762.102 ms
Loss rate: 6.90%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 813.033 ms
Loss rate: 10.42%
-- Flow 3:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 832.241 ms
Loss rate: 52.61%
```

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

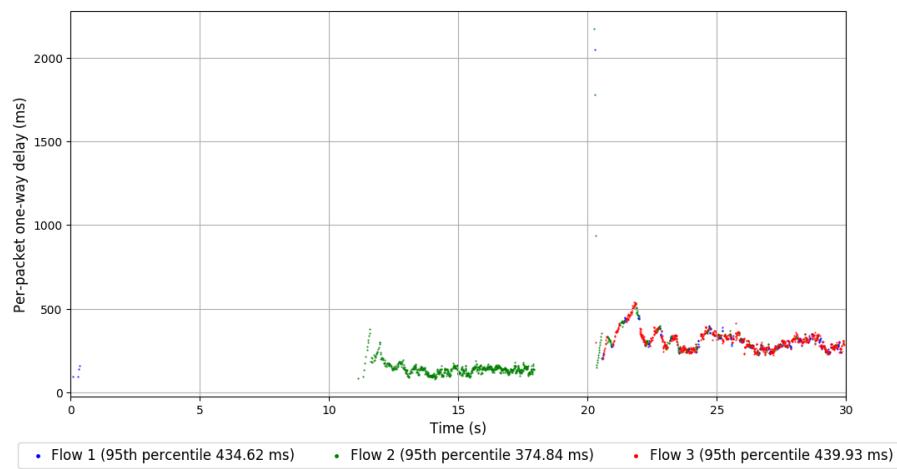
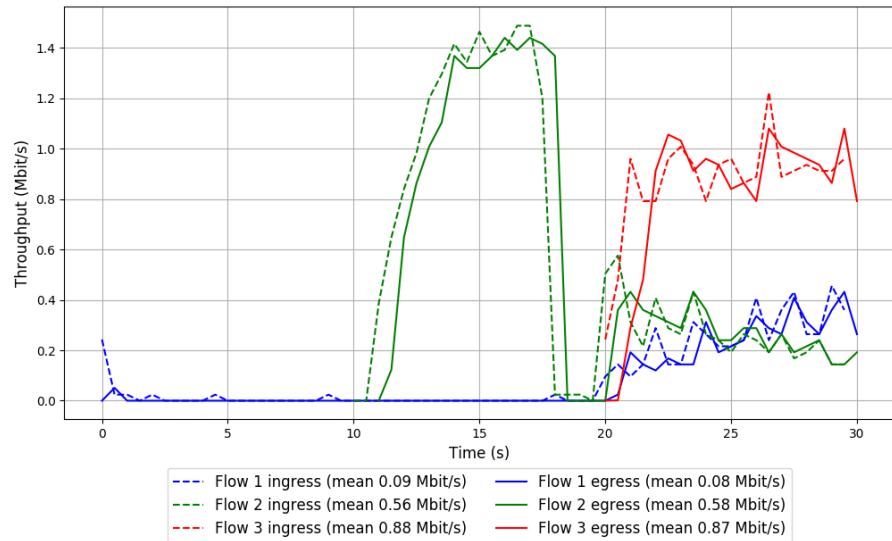


Run 1: Statistics of TCP Vegas

```
Start at: 2018-06-30 12:56:16
End at: 2018-06-30 12:56:46
Local clock offset: 3.463 ms
Remote clock offset: -9.144 ms

# Below is generated by plot.py at 2018-06-30 13:55:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.73 Mbit/s
95th percentile per-packet one-way delay: 394.943 ms
Loss rate: 3.58%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 434.619 ms
Loss rate: 10.96%
-- Flow 2:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 374.840 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 439.933 ms
Loss rate: 3.32%
```

Run 1: Report of TCP Vegas — Data Link

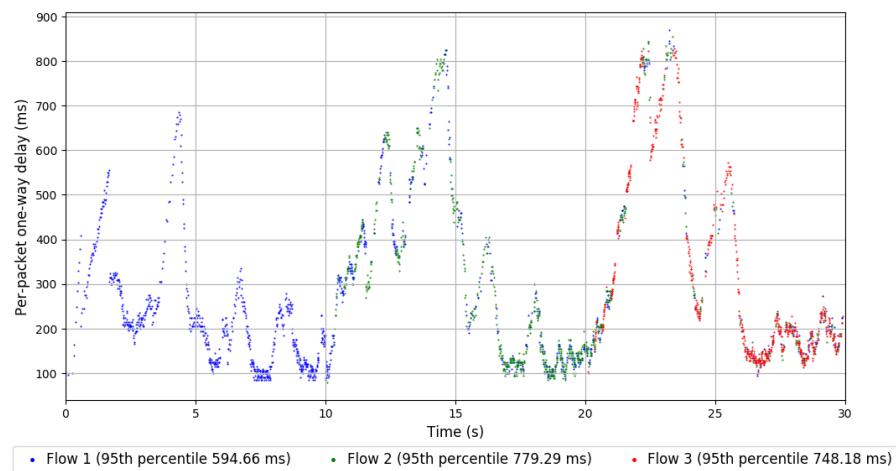
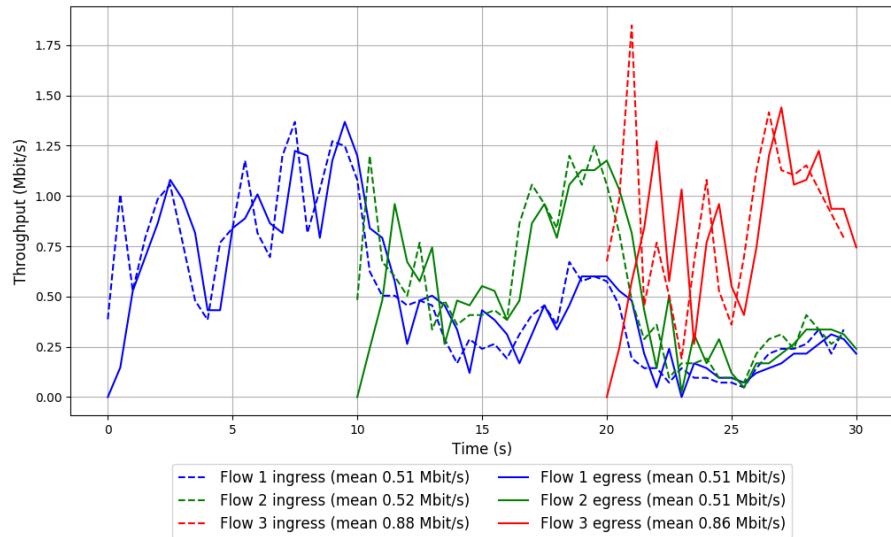


Run 2: Statistics of TCP Vegas

```
Start at: 2018-06-30 13:20:52
End at: 2018-06-30 13:21:22
Local clock offset: 8.315 ms
Remote clock offset: -9.993 ms

# Below is generated by plot.py at 2018-06-30 13:55:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 713.344 ms
Loss rate: 1.68%
-- Flow 1:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 594.661 ms
Loss rate: 0.78%
-- Flow 2:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 779.292 ms
Loss rate: 1.64%
-- Flow 3:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 748.179 ms
Loss rate: 3.31%
```

Run 2: Report of TCP Vegas — Data Link

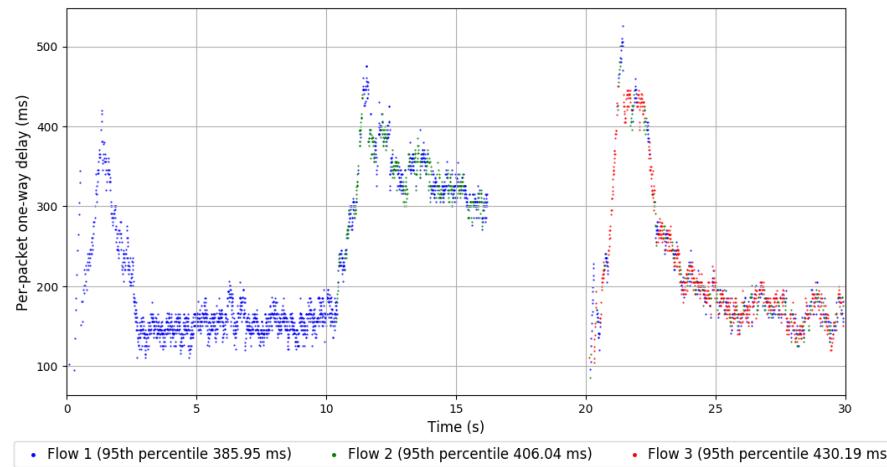
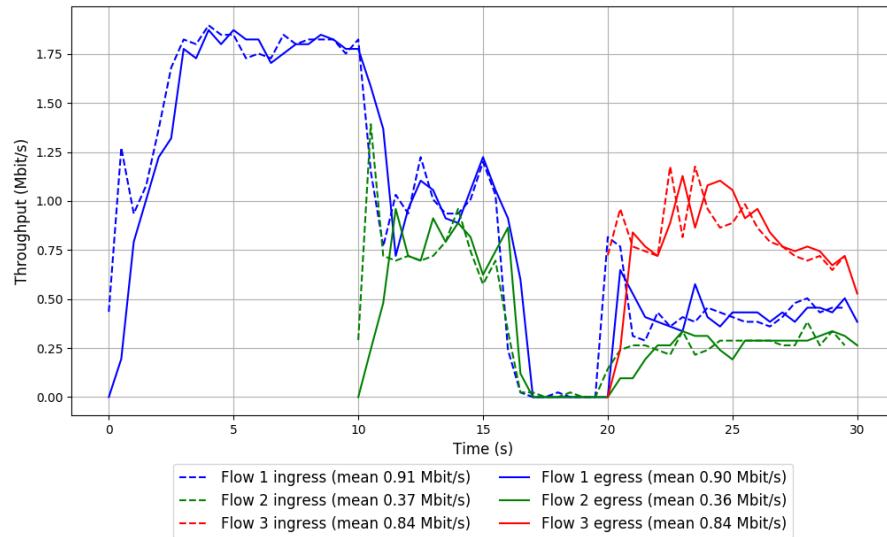


Run 3: Statistics of TCP Vegas

```
Start at: 2018-06-30 13:44:17
End at: 2018-06-30 13:44:47
Local clock offset: 9.669 ms
Remote clock offset: -9.288 ms

# Below is generated by plot.py at 2018-06-30 13:55:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.41 Mbit/s
95th percentile per-packet one-way delay: 405.228 ms
Loss rate: 1.96%
-- Flow 1:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 385.950 ms
Loss rate: 1.19%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 406.044 ms
Loss rate: 4.54%
-- Flow 3:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 430.193 ms
Loss rate: 2.15%
```

Run 3: Report of TCP Vegas — Data Link

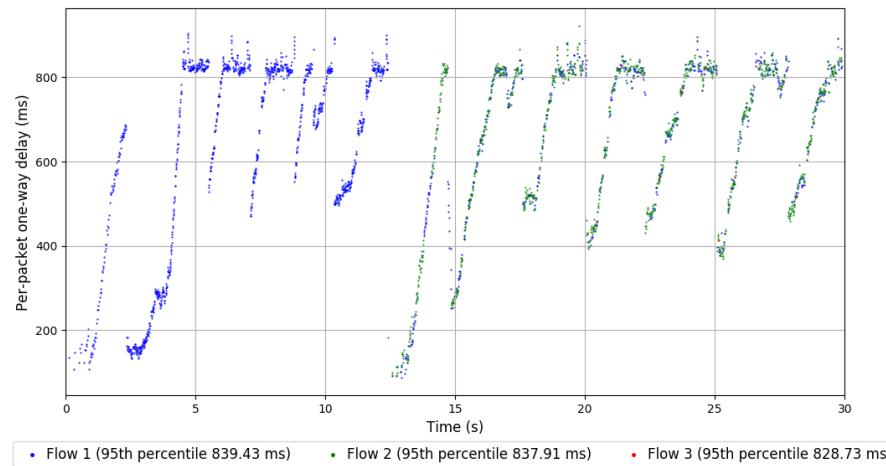
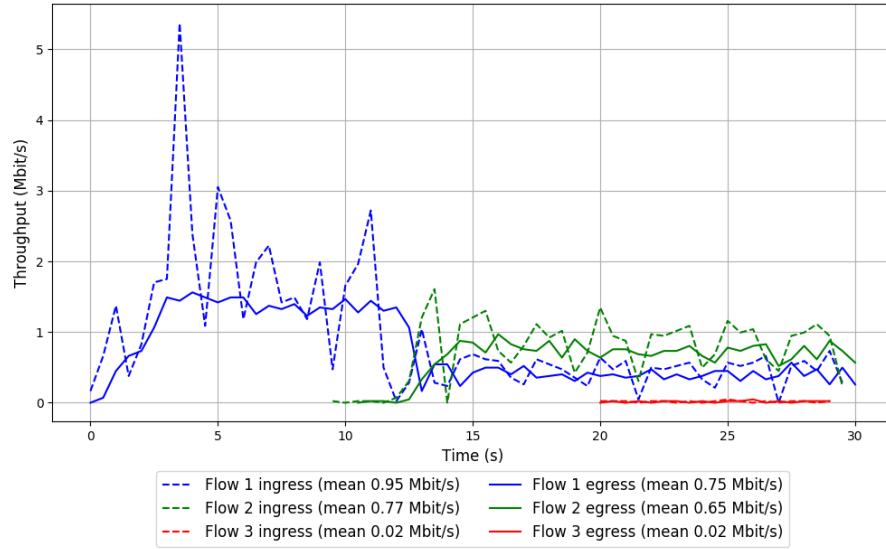


Run 1: Statistics of Verus

```
Start at: 2018-06-30 12:50:07
End at: 2018-06-30 12:50:37
Local clock offset: -1.011 ms
Remote clock offset: -9.521 ms

# Below is generated by plot.py at 2018-06-30 13:55:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 838.682 ms
Loss rate: 19.60%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 839.431 ms
Loss rate: 21.45%
-- Flow 2:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 837.911 ms
Loss rate: 16.29%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 828.727 ms
Loss rate: 7.14%
```

Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

/home/ubuntu/pantheon/data/2018-06-30T12-41-China-ppp0-to-AWS-Korea-3-runs-3-flows/verus_st

Run 2: Report of Verus — Data Link

Figure is missing

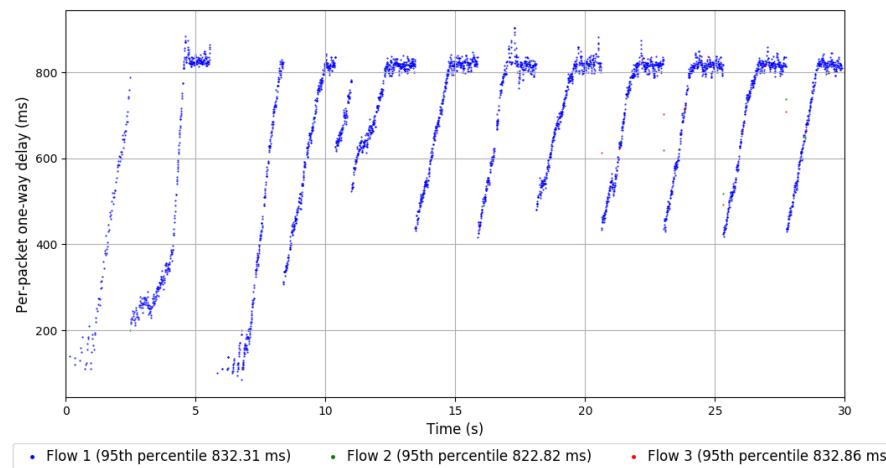
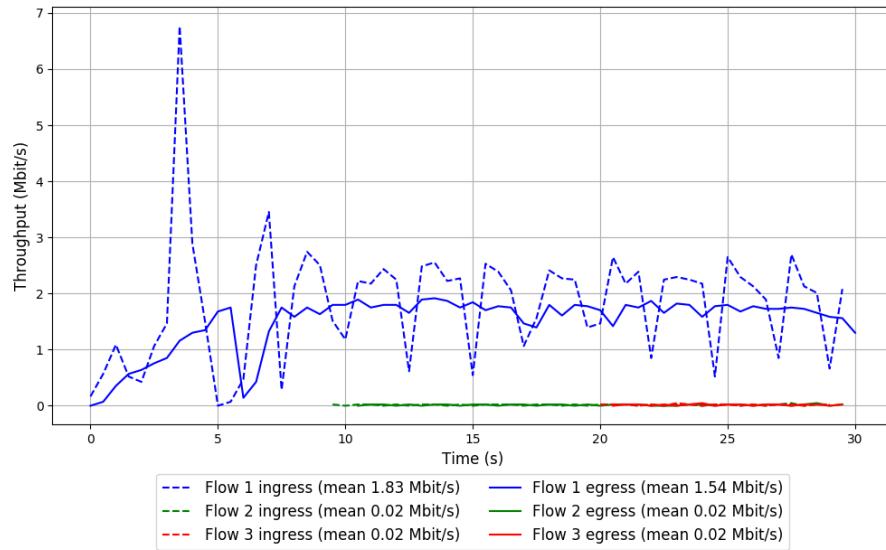
Figure is missing

Run 3: Statistics of Verus

```
Start at: 2018-06-30 13:38:40
End at: 2018-06-30 13:39:10
Local clock offset: 9.241 ms
Remote clock offset: -9.851 ms

# Below is generated by plot.py at 2018-06-30 13:55:20
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.55 Mbit/s
95th percentile per-packet one-way delay: 832.314 ms
Loss rate: 16.41%
-- Flow 1:
Average throughput: 1.54 Mbit/s
95th percentile per-packet one-way delay: 832.314 ms
Loss rate: 16.49%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 822.819 ms
Loss rate: 7.41%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 832.859 ms
Loss rate: 7.14%
```

Run 3: Report of Verus — Data Link

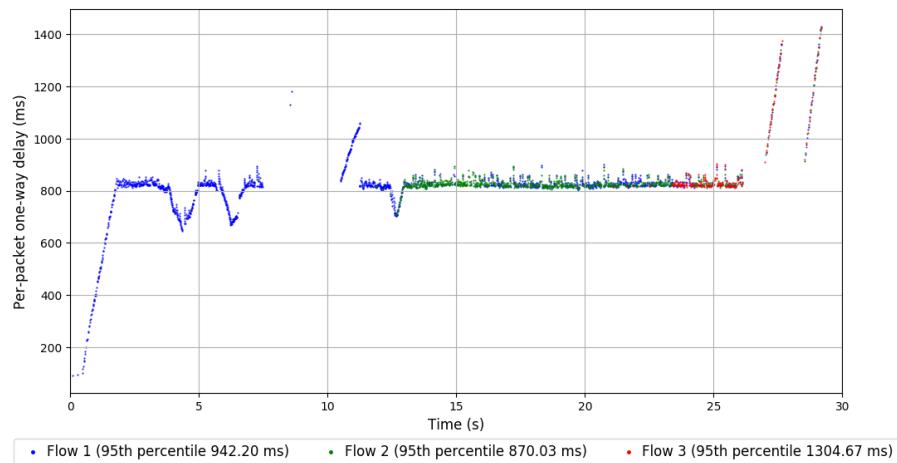
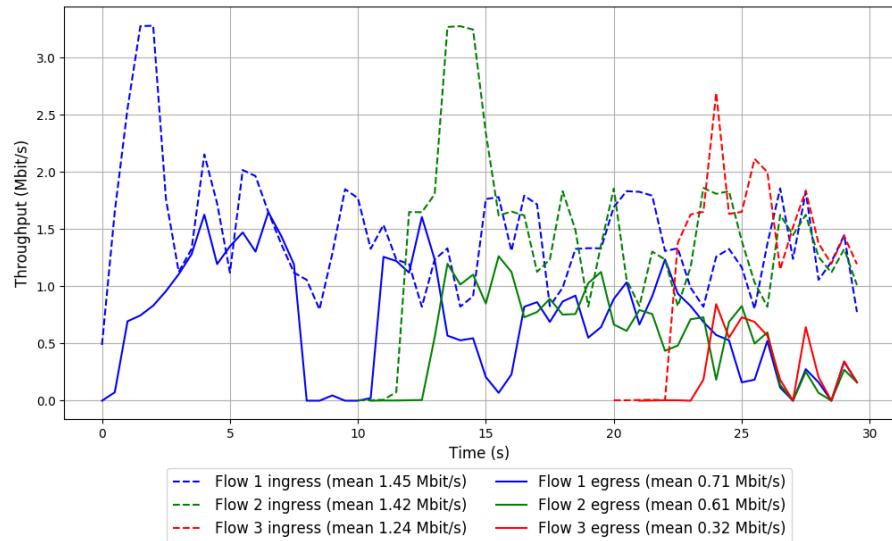


```
Run 1: Statistics of PCC-Vivace
```

```
Start at: 2018-06-30 13:06:15
End at: 2018-06-30 13:06:45
Local clock offset: 6.423 ms
Remote clock offset: -9.662 ms

# Below is generated by plot.py at 2018-06-30 13:55:21
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.17 Mbit/s
95th percentile per-packet one-way delay: 997.364 ms
Loss rate: 59.31%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 942.204 ms
Loss rate: 52.64%
-- Flow 2:
Average throughput: 0.61 Mbit/s
95th percentile per-packet one-way delay: 870.028 ms
Loss rate: 60.98%
-- Flow 3:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 1304.666 ms
Loss rate: 79.11%
```

Run 1: Report of PCC-Vivace — Data Link

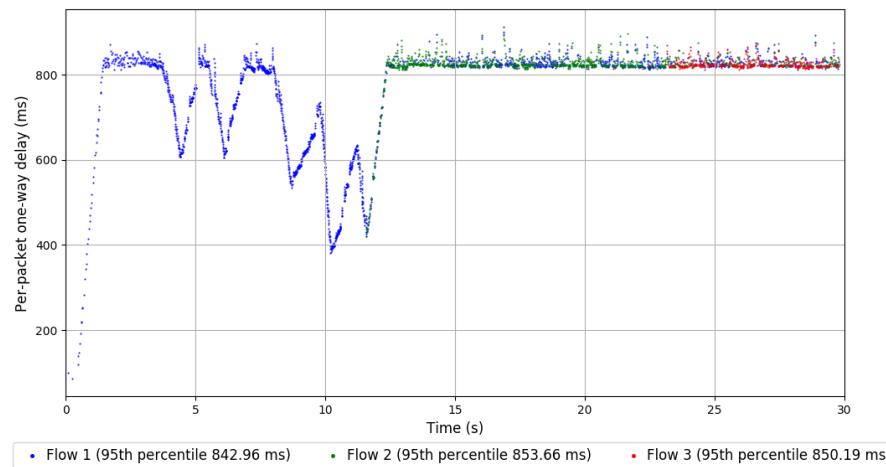
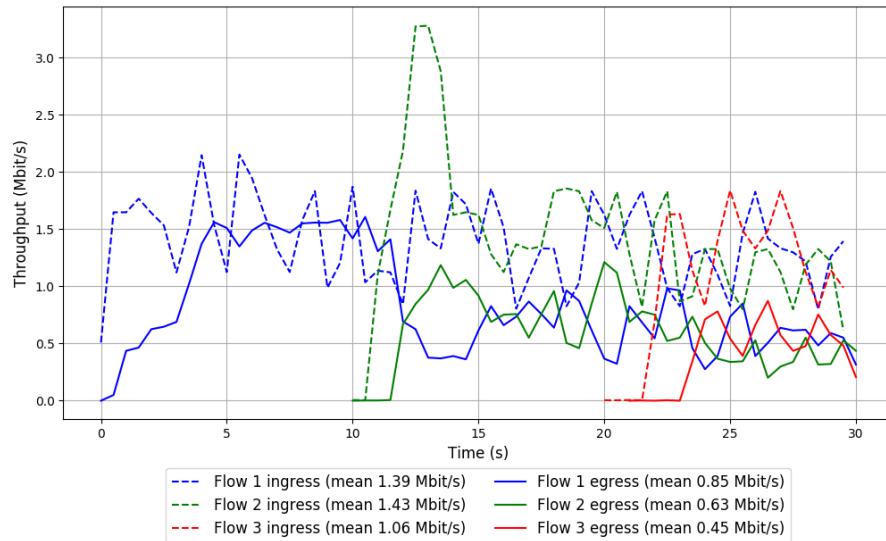


Run 2: Statistics of PCC-Vivace

```
Start at: 2018-06-30 13:30:22
End at: 2018-06-30 13:30:52
Local clock offset: 8.526 ms
Remote clock offset: -10.104 ms

# Below is generated by plot.py at 2018-06-30 13:55:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.39 Mbit/s
95th percentile per-packet one-way delay: 847.380 ms
Loss rate: 48.81%
-- Flow 1:
Average throughput: 0.85 Mbit/s
95th percentile per-packet one-way delay: 842.962 ms
Loss rate: 39.69%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 853.661 ms
Loss rate: 57.12%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 850.192 ms
Loss rate: 62.61%
```

Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

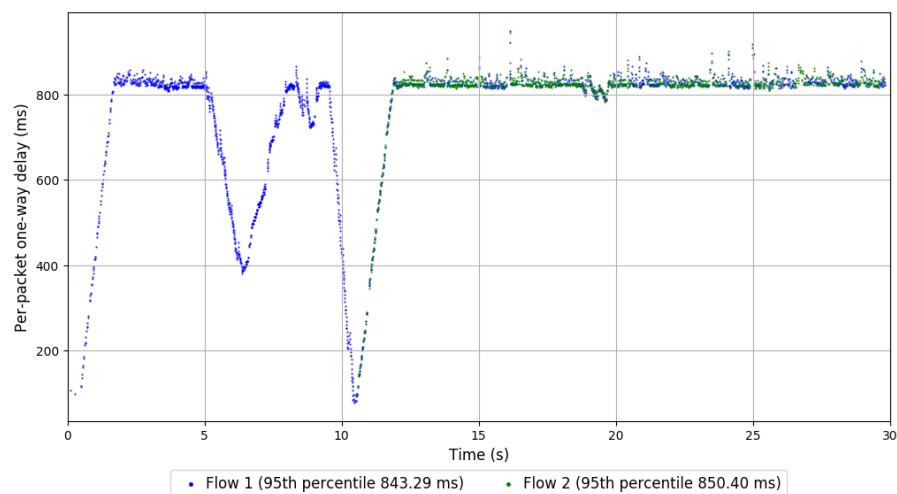
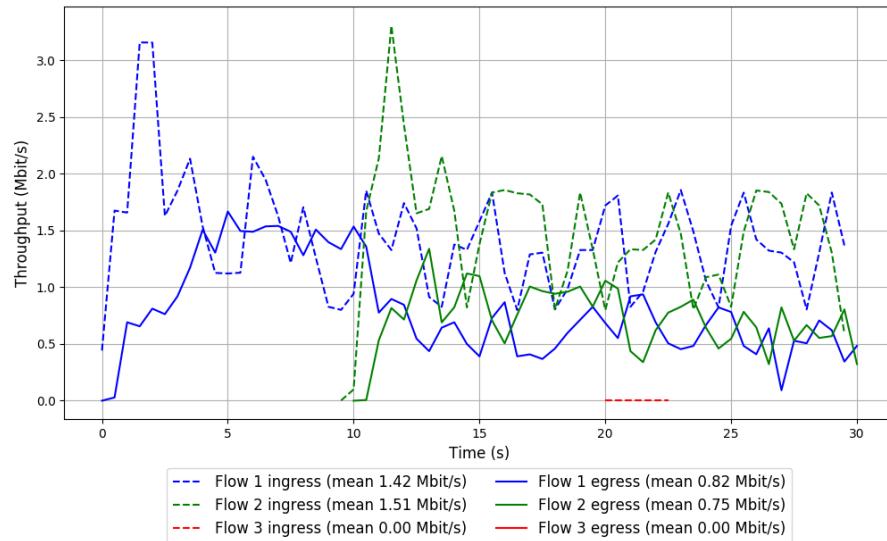
Start at: 2018-06-30 13:54:04

End at: 2018-06-30 13:54:34

Local clock offset: 3.888 ms

Remote clock offset: -8.846 ms

Run 3: Report of PCC-Vivace — Data Link

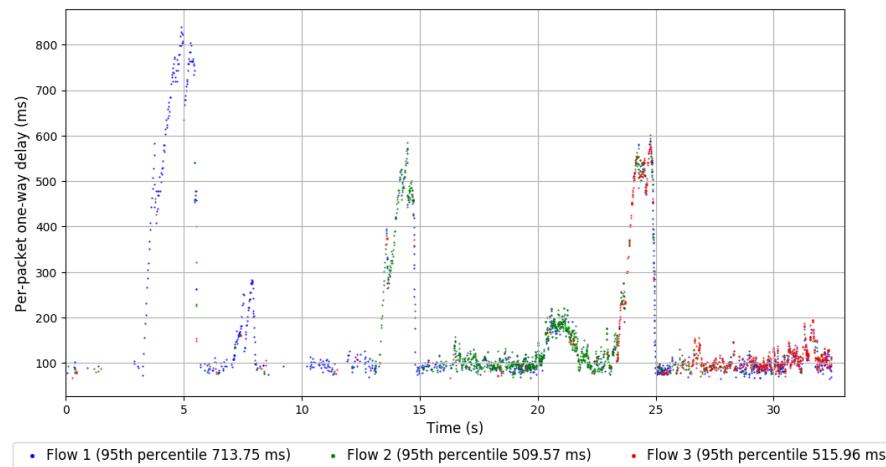
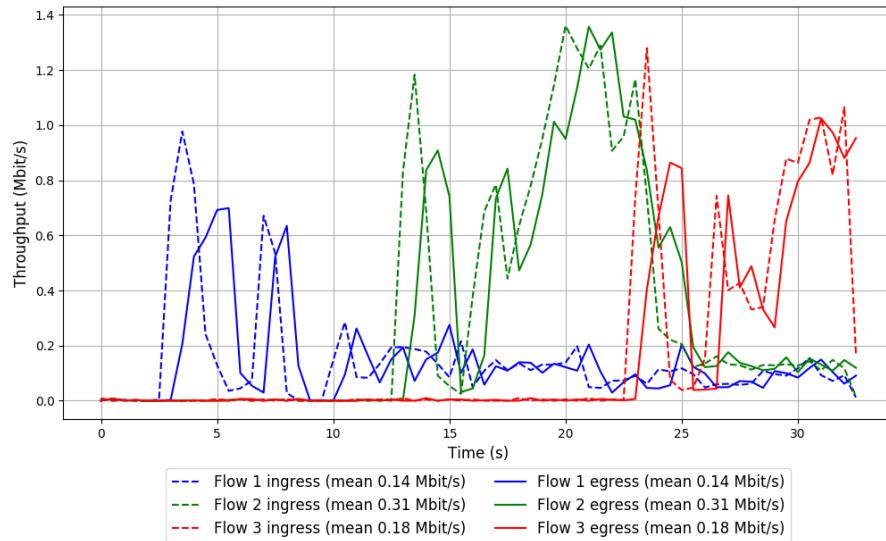


Run 1: Statistics of WebRTC media

```
Start at: 2018-06-30 13:01:41
End at: 2018-06-30 13:02:11
Local clock offset: 5.547 ms
Remote clock offset: -9.201 ms

# Below is generated by plot.py at 2018-06-30 13:55:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 539.451 ms
Loss rate: 1.51%
-- Flow 1:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 713.753 ms
Loss rate: 1.15%
-- Flow 2:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 509.575 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 515.955 ms
Loss rate: 3.98%
```

Run 1: Report of WebRTC media — Data Link

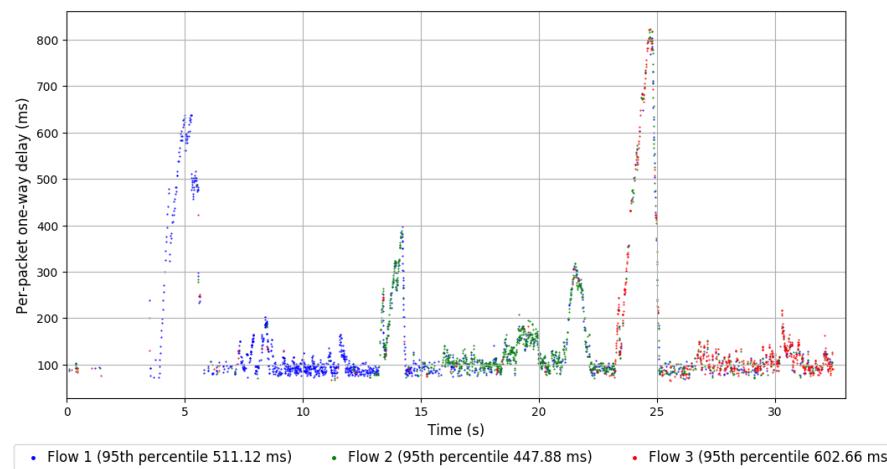
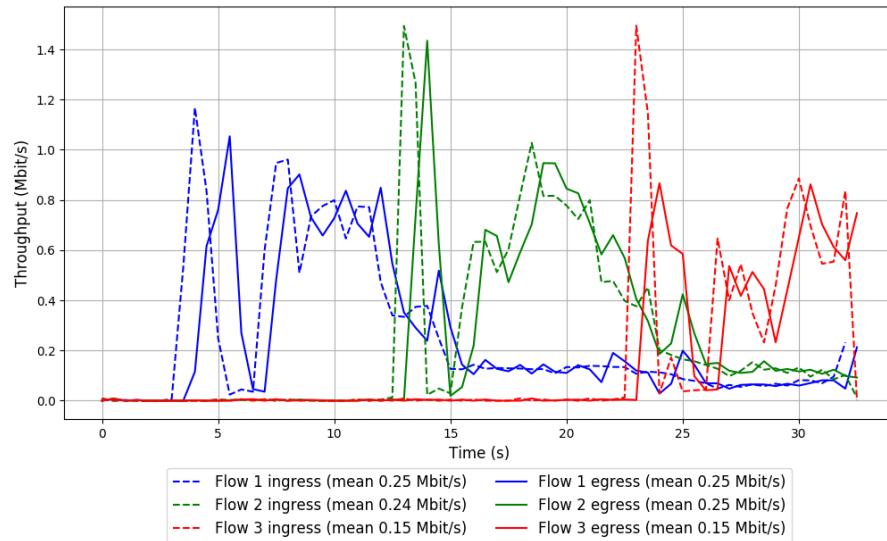


Run 2: Statistics of WebRTC media

```
Start at: 2018-06-30 13:26:15
End at: 2018-06-30 13:26:45
Local clock offset: 8.429 ms
Remote clock offset: -10.066 ms

# Below is generated by plot.py at 2018-06-30 13:55:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 519.793 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 511.119 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 447.875 ms
Loss rate: 0.20%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 602.660 ms
Loss rate: 2.82%
```

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

```
Start at: 2018-06-30 13:49:46
End at: 2018-06-30 13:50:16
Local clock offset: 5.978 ms
Remote clock offset: -8.992 ms

# Below is generated by plot.py at 2018-06-30 13:55:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 385.661 ms
Loss rate: 1.08%
-- Flow 1:
Average throughput: 0.31 Mbit/s
95th percentile per-packet one-way delay: 476.239 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 375.660 ms
Loss rate: 0.49%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 336.870 ms
Loss rate: 2.99%
```

Run 3: Report of WebRTC media — Data Link

