

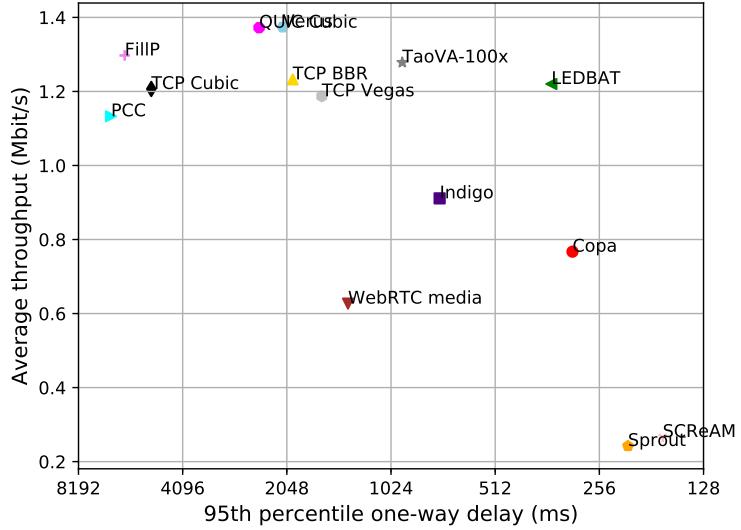
Pantheon Report

Generated at 2017-12-20 19:46:21 (UTC).
Data path: AWS Brazil 2 Ethernet (*local*) → Colombia ppp0 (*remote*).
Repeated the test of 14 congestion control schemes 3 times.
Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo_fast**).
NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

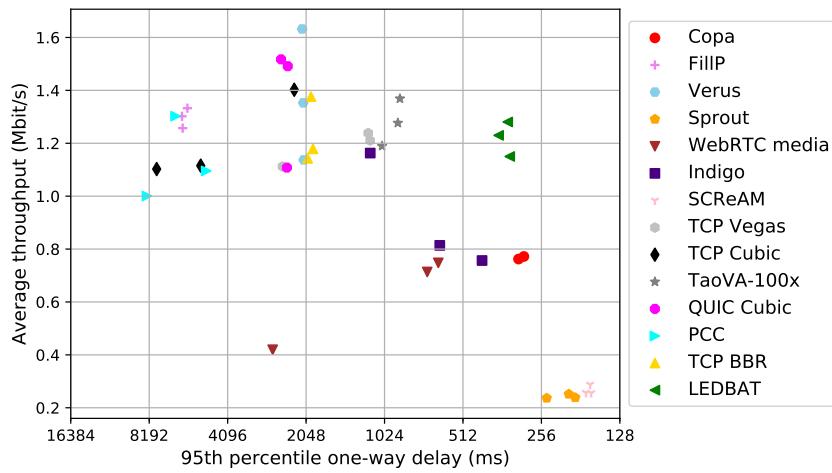
Git summary:

```
branch: master @ 904a5750834816b1e46a2c86405d707788d27c16
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ dcaef6b00654e660f73f7ed679d2eab61ce08639
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows (mean of all runs by scheme)



test from AWS Brazil 2 Ethernet to Colombia ppp0, 3 runs of 30s each per scheme
3 flows with 10s interval between flows



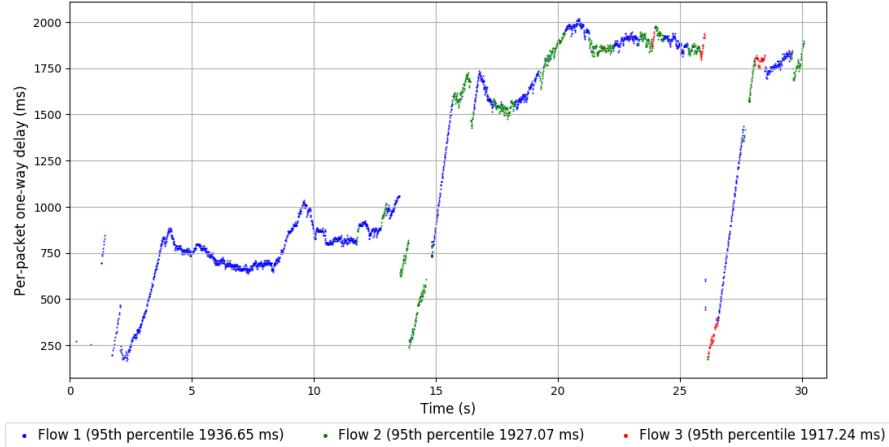
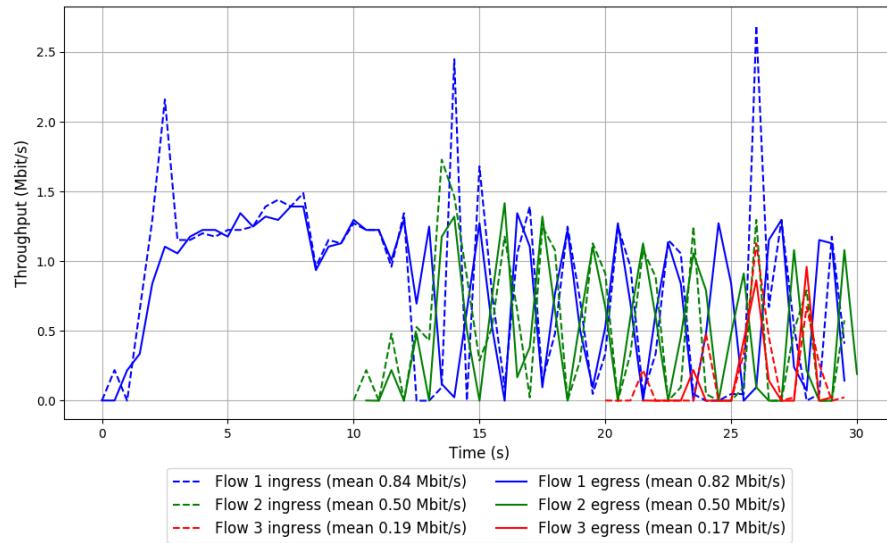
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.87	0.51	0.20	1877.64	2028.36	2124.66	3.71	7.80	31.82
TCP Cubic		1.04	0.28	0.04	5066.03	4803.60	5097.00	15.36	32.09	66.94
LEDBAT		0.89	0.36	0.30	352.28	349.22	362.45	0.51	0.42	3.94
PCC		0.77	0.55	0.00	6544.40	6584.43	5932.89	49.55	29.64	38.33
QUIC Cubic		1.09	0.37	0.14	2386.84	2491.45	2416.23	5.80	16.14	33.33
SCReAM		0.08	0.20	0.16	157.95	171.41	169.12	0.22	0.42	0.35
WebRTC media		0.38	0.18	0.08	1288.79	1229.40	1064.09	0.07	0.17	0.58
Sprout		0.11	0.12	0.14	381.71	187.23	205.33	0.38	0.21	0.62
TaoVA-100x		0.75	0.58	0.46	890.89	948.56	1105.38	2.08	2.56	9.51
TCP Vegas		0.79	0.36	0.49	1756.35	989.47	988.67	1.50	2.30	7.37
Verus		1.36	0.01	0.01	2105.44	2077.84	2005.49	4.41	8.02	16.67
Copa		0.68	0.88	0.48	2869.75	291.08	325.86	0.00	0.78	2.62
FillP		1.28	0.04	0.00	6018.46	5783.65	5536.37	96.09	40.84	77.29
Indigo		0.49	0.35	0.58	857.25	560.43	511.10	0.72	0.47	0.60

Run 1: Statistics of TCP BBR

```
Start at: 2017-12-20 18:53:59
End at: 2017-12-20 18:54:29
Local clock offset: -0.101 ms
Remote clock offset: 17.824 ms

# Below is generated by plot.py at 2017-12-20 19:45:48
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 1927.166 ms
Loss rate: 4.50%
-- Flow 1:
Average throughput: 0.82 Mbit/s
95th percentile per-packet one-way delay: 1936.655 ms
Loss rate: 3.51%
-- Flow 2:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 1927.067 ms
Loss rate: 3.00%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 1917.237 ms
Loss rate: 26.61%
```

Run 1: Report of TCP BBR — Data Link

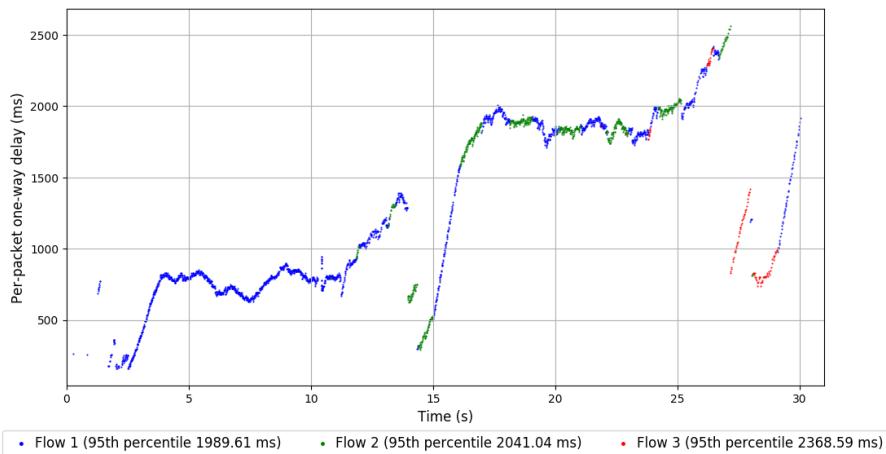
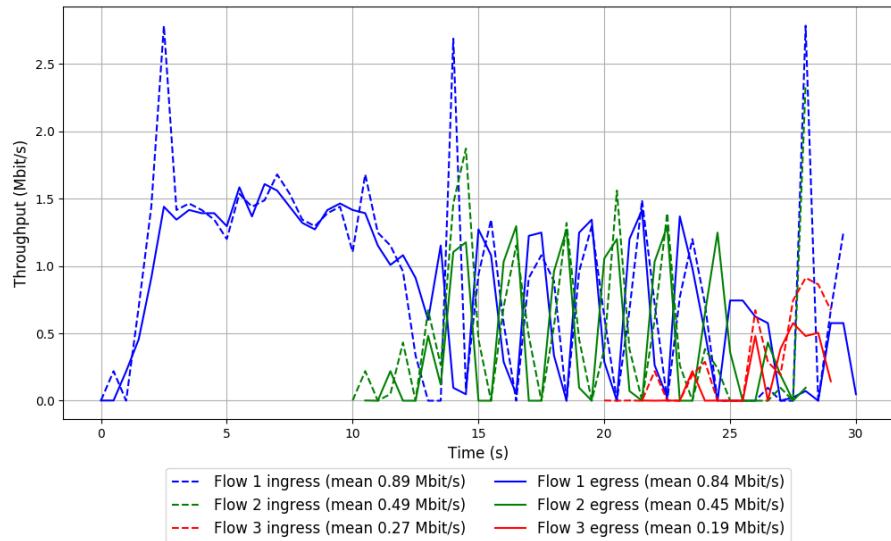


Run 2: Statistics of TCP BBR

```
Start at: 2017-12-20 19:12:48
End at: 2017-12-20 19:13:18
Local clock offset: -0.03 ms
Remote clock offset: 18.235 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 2019.775 ms
Loss rate: 10.65%
-- Flow 1:
Average throughput: 0.84 Mbit/s
95th percentile per-packet one-way delay: 1989.606 ms
Loss rate: 6.56%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 2041.035 ms
Loss rate: 13.26%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 2368.587 ms
Loss rate: 44.69%
```

Run 2: Report of TCP BBR — Data Link

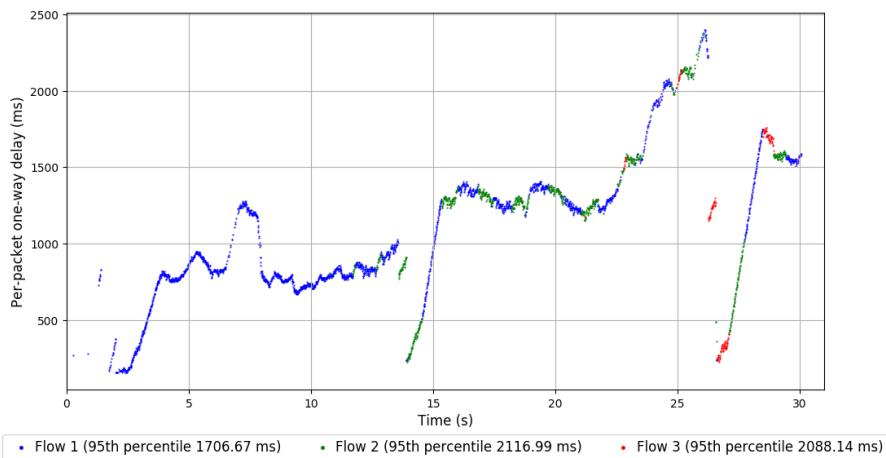
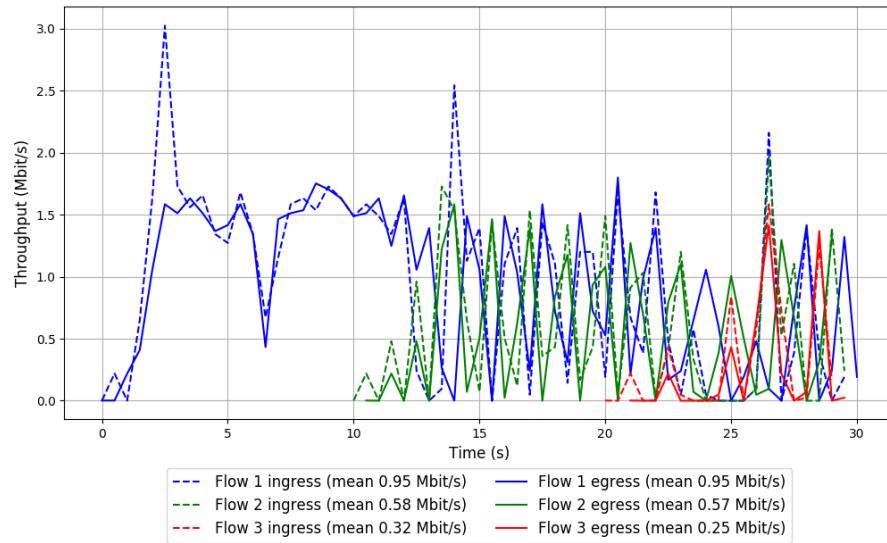


Run 3: Statistics of TCP BBR

```
Start at: 2017-12-20 19:31:41
End at: 2017-12-20 19:32:11
Local clock offset: -0.036 ms
Remote clock offset: 13.869 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.38 Mbit/s
95th percentile per-packet one-way delay: 1961.168 ms
Loss rate: 4.26%
-- Flow 1:
Average throughput: 0.95 Mbit/s
95th percentile per-packet one-way delay: 1706.666 ms
Loss rate: 1.05%
-- Flow 2:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 2116.985 ms
Loss rate: 7.15%
-- Flow 3:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 2088.143 ms
Loss rate: 24.15%
```

Run 3: Report of TCP BBR — Data Link

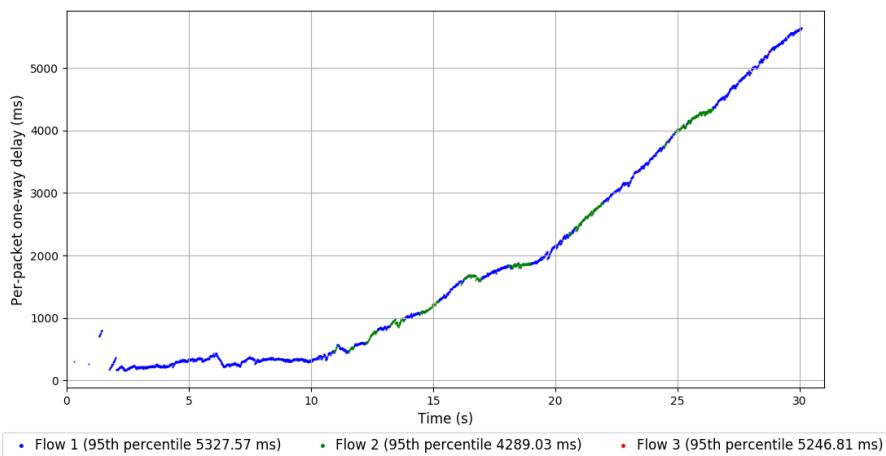
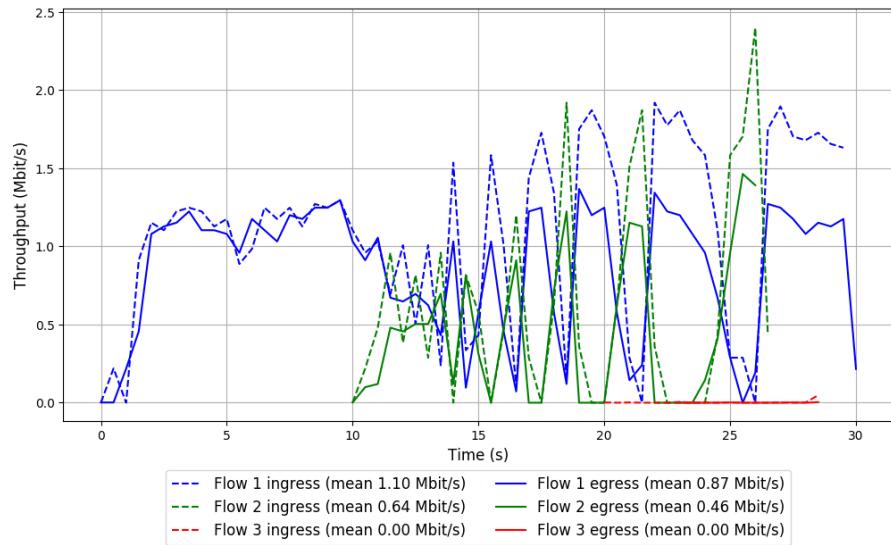


Run 1: Statistics of TCP Cubic

```
Start at: 2017-12-20 18:52:44
End at: 2017-12-20 18:53:14
Local clock offset: -0.033 ms
Remote clock offset: 16.969 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.12 Mbit/s
95th percentile per-packet one-way delay: 5197.179 ms
Loss rate: 23.65%
-- Flow 1:
Average throughput: 0.87 Mbit/s
95th percentile per-packet one-way delay: 5327.573 ms
Loss rate: 21.28%
-- Flow 2:
Average throughput: 0.46 Mbit/s
95th percentile per-packet one-way delay: 4289.026 ms
Loss rate: 30.80%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5246.808 ms
Loss rate: 87.02%
```

Run 1: Report of TCP Cubic — Data Link

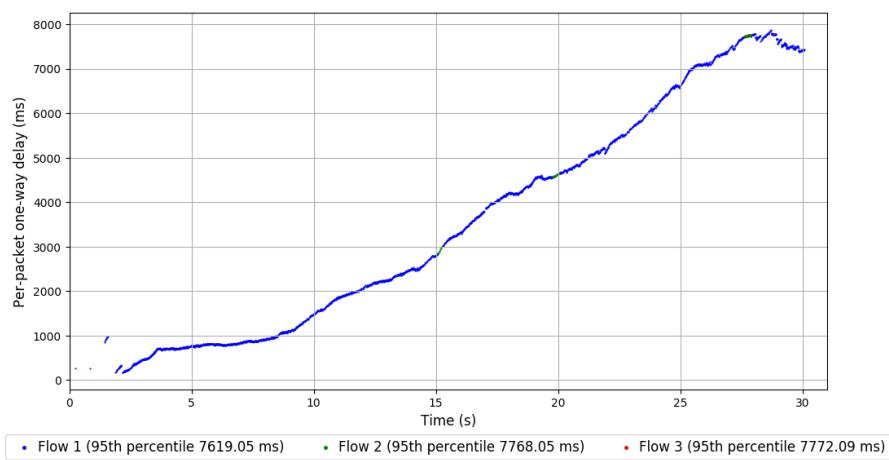
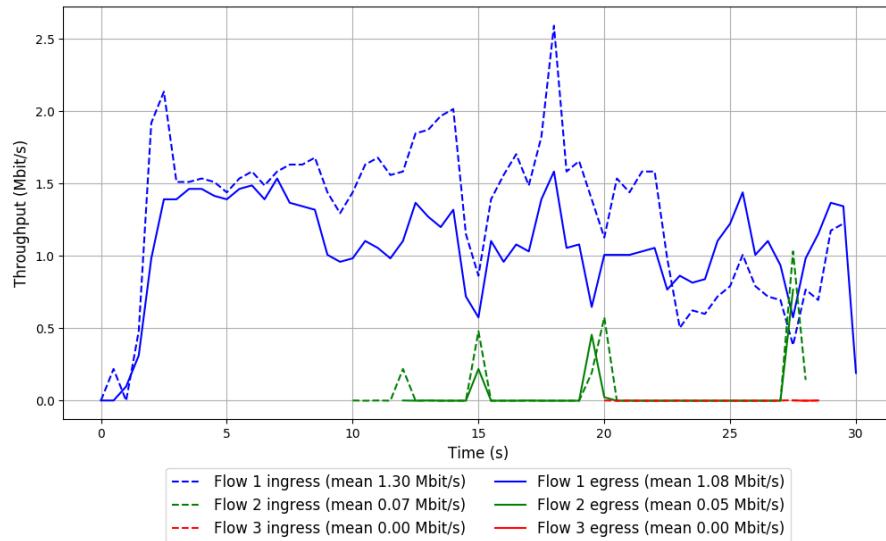


Run 2: Statistics of TCP Cubic

```
Start at: 2017-12-20 19:11:33
End at: 2017-12-20 19:12:03
Local clock offset: -0.01 ms
Remote clock offset: 15.036 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 7669.258 ms
Loss rate: 18.42%
-- Flow 1:
Average throughput: 1.08 Mbit/s
95th percentile per-packet one-way delay: 7619.052 ms
Loss rate: 17.53%
-- Flow 2:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 7768.052 ms
Loss rate: 44.41%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7772.093 ms
Loss rate: 71.93%
```

Run 2: Report of TCP Cubic — Data Link

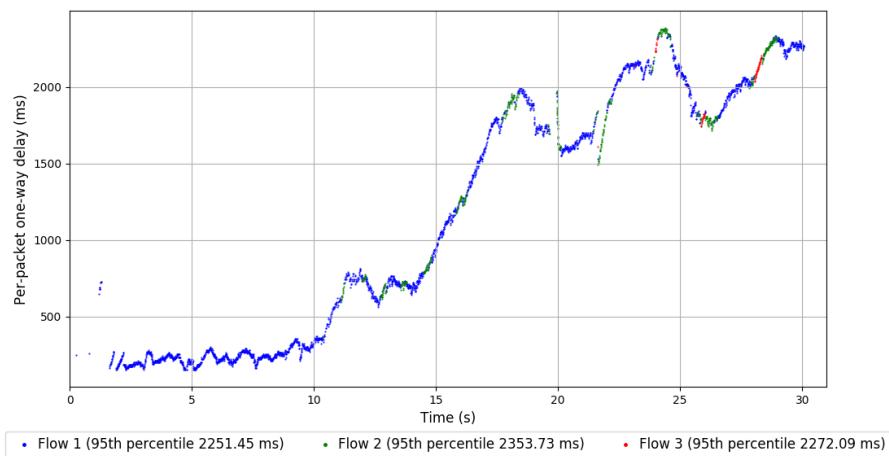
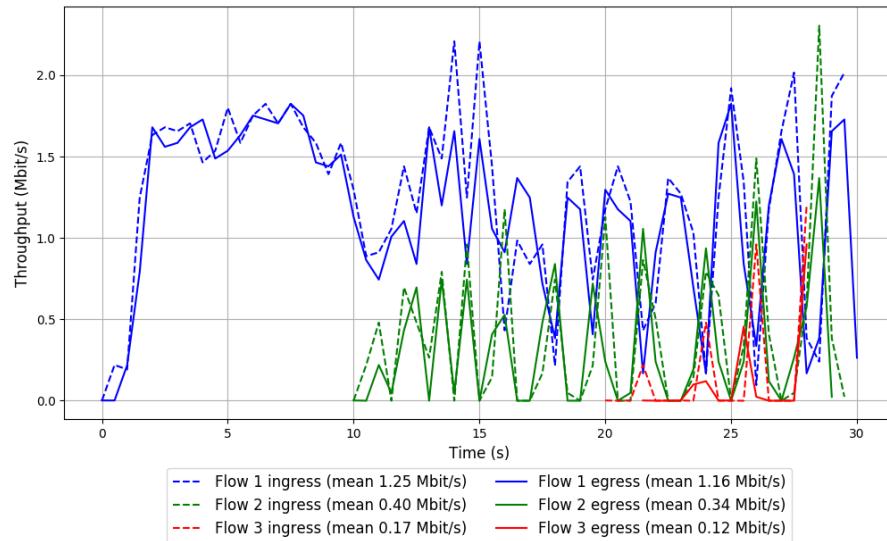


Run 3: Statistics of TCP Cubic

```
Start at: 2017-12-20 19:30:21
End at: 2017-12-20 19:30:51
Local clock offset: -0.005 ms
Remote clock offset: 13.202 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.40 Mbit/s
95th percentile per-packet one-way delay: 2273.757 ms
Loss rate: 10.69%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 2251.450 ms
Loss rate: 7.26%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 2353.728 ms
Loss rate: 21.07%
-- Flow 3:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 2272.086 ms
Loss rate: 41.88%
```

Run 3: Report of TCP Cubic — Data Link

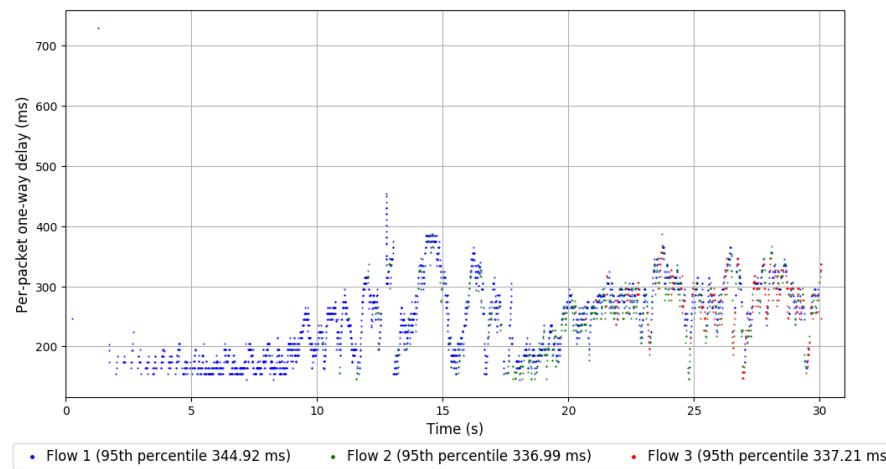
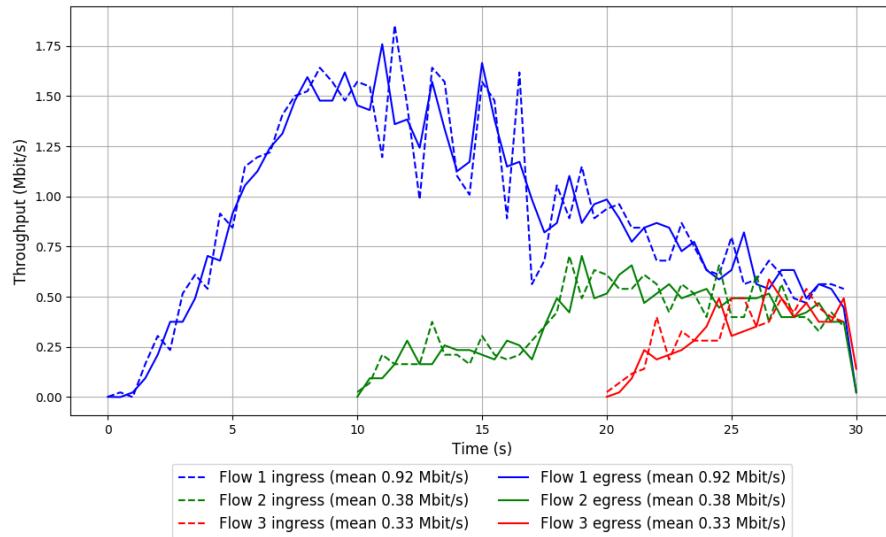


```
Run 1: Statistics of LEDBAT
```

```
Start at: 2017-12-20 19:02:47
End at: 2017-12-20 19:03:17
Local clock offset: 0.003 ms
Remote clock offset: 11.466 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 344.780 ms
Loss rate: 0.76%
-- Flow 1:
Average throughput: 0.92 Mbit/s
95th percentile per-packet one-way delay: 344.920 ms
Loss rate: 0.64%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 336.986 ms
Loss rate: 1.08%
-- Flow 3:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 337.215 ms
Loss rate: 1.08%
```

Run 1: Report of LEDBAT — Data Link

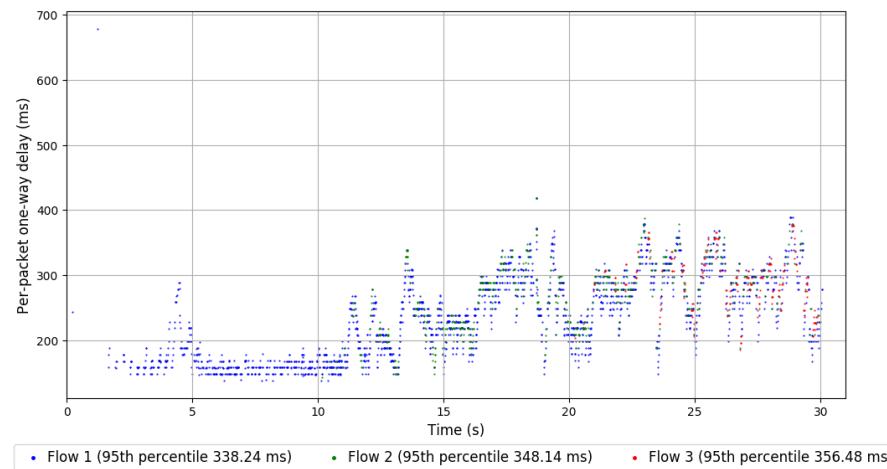
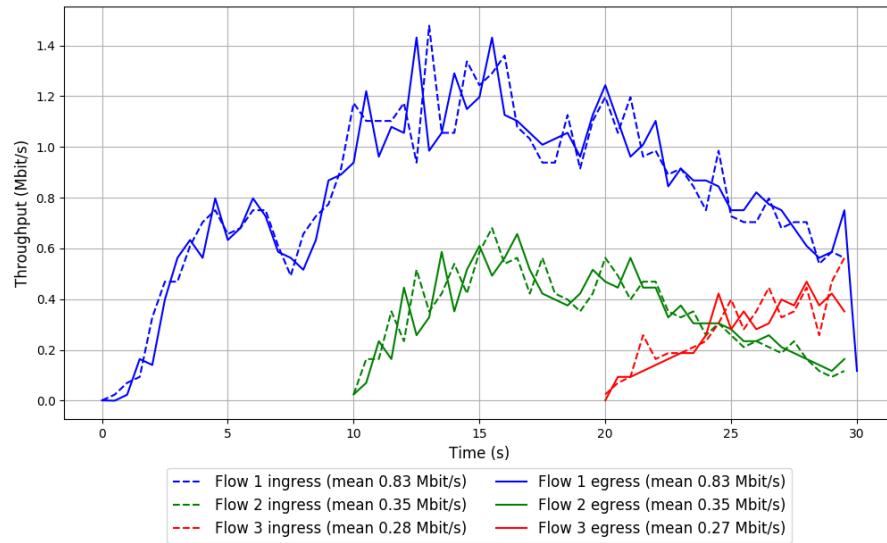


Run 2: Statistics of LEDBAT

```
Start at: 2017-12-20 19:21:35
End at: 2017-12-20 19:22:05
Local clock offset: -0.015 ms
Remote clock offset: 8.645 ms

# Below is generated by plot.py at 2017-12-20 19:45:49
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.15 Mbit/s
95th percentile per-packet one-way delay: 338.697 ms
Loss rate: 0.85%
-- Flow 1:
Average throughput: 0.83 Mbit/s
95th percentile per-packet one-way delay: 338.236 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 348.143 ms
Loss rate: 0.17%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 356.479 ms
Loss rate: 6.25%
```

Run 2: Report of LEDBAT — Data Link

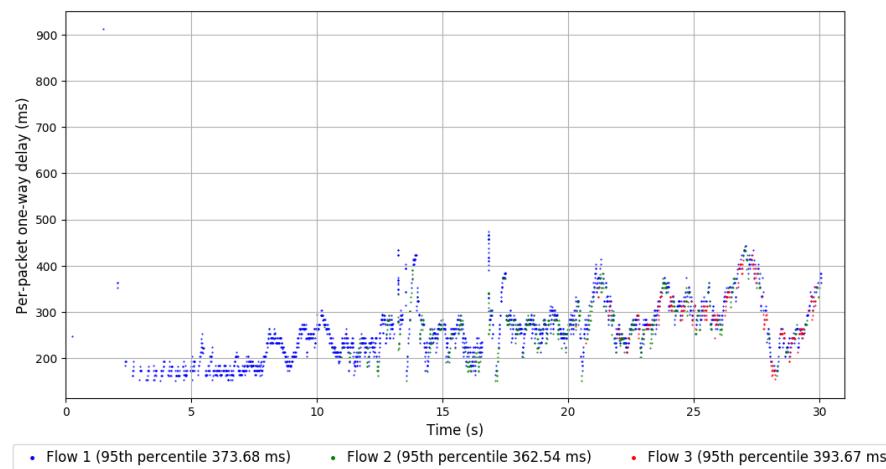
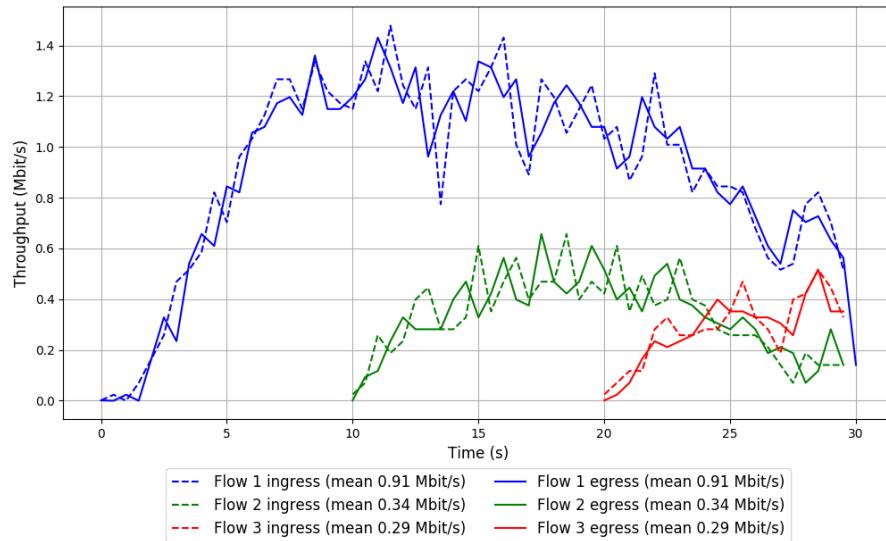


Run 3: Statistics of LEDBAT

```
Start at: 2017-12-20 19:40:25
End at: 2017-12-20 19:40:55
Local clock offset: -0.012 ms
Remote clock offset: 12.619 ms

# Below is generated by plot.py at 2017-12-20 19:45:52
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.23 Mbit/s
95th percentile per-packet one-way delay: 373.674 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 0.91 Mbit/s
95th percentile per-packet one-way delay: 373.679 ms
Loss rate: 0.47%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 362.542 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 393.669 ms
Loss rate: 4.49%
```

Run 3: Report of LEDBAT — Data Link

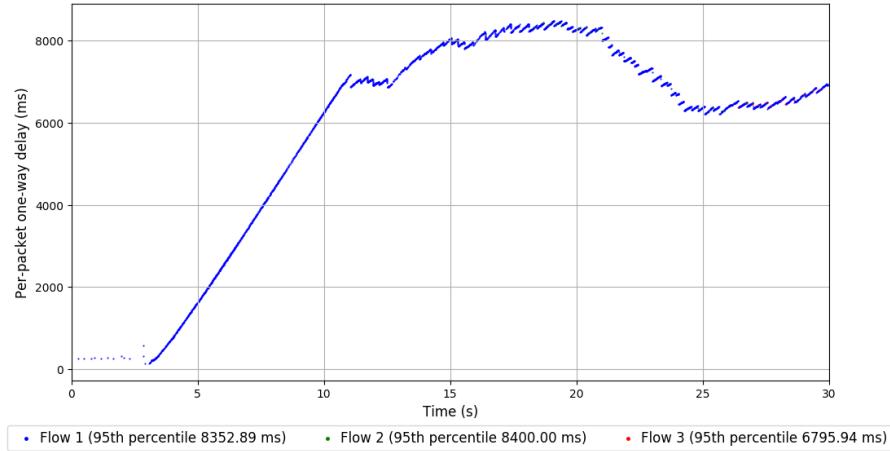
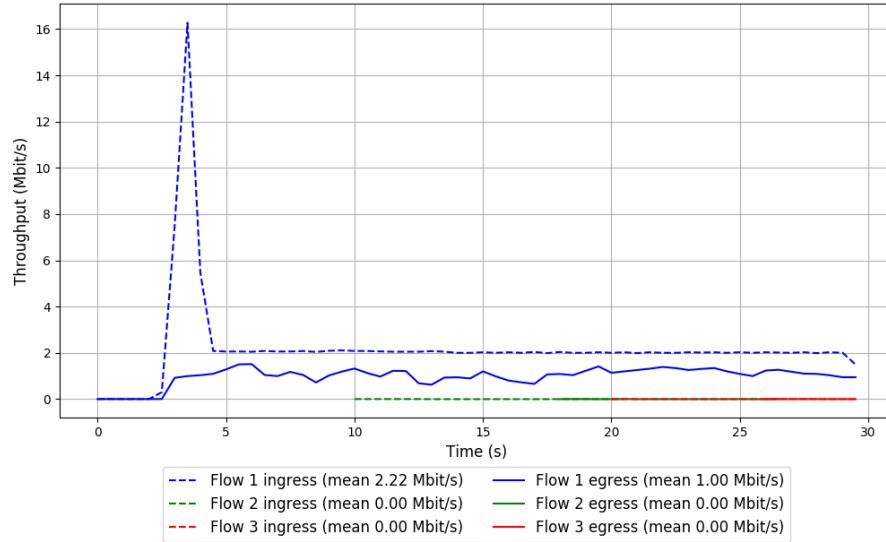


Run 1: Statistics of PCC

```
Start at: 2017-12-20 18:50:14
End at: 2017-12-20 18:50:44
Local clock offset: -0.036 ms
Remote clock offset: 11.699 ms

# Below is generated by plot.py at 2017-12-20 19:45:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 8354.513 ms
Loss rate: 55.24%
-- Flow 1:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 8352.893 ms
Loss rate: 55.25%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8400.003 ms
Loss rate: 26.01%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6795.935 ms
Loss rate: 47.76%
```

Run 1: Report of PCC — Data Link

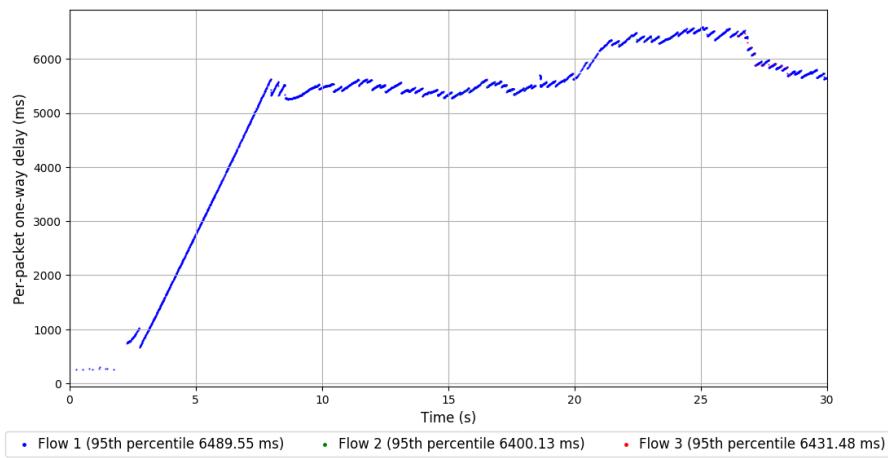
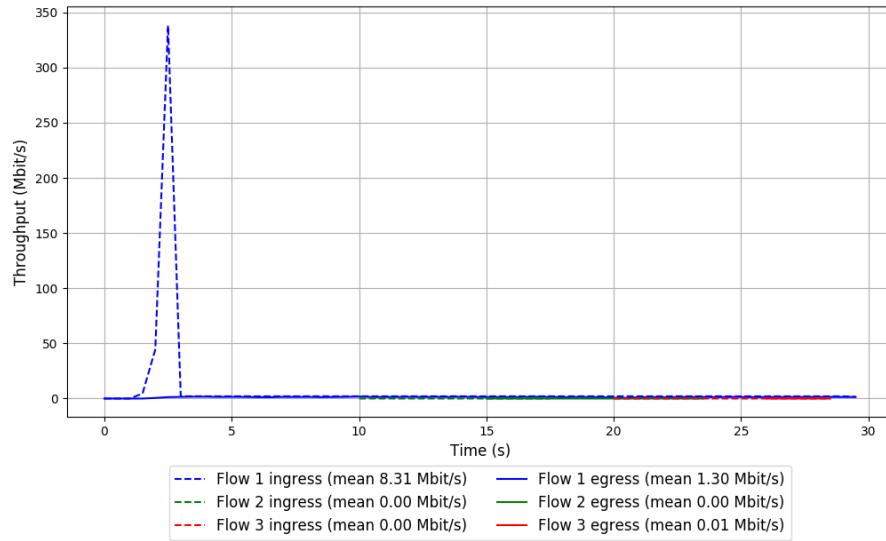


Run 2: Statistics of PCC

```
Start at: 2017-12-20 19:09:03
End at: 2017-12-20 19:09:33
Local clock offset: -0.064 ms
Remote clock offset: 16.971 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 6489.015 ms
Loss rate: 84.41%
-- Flow 1:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 6489.548 ms
Loss rate: 84.42%
-- Flow 2:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6400.128 ms
Loss rate: 14.80%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 6431.483 ms
Loss rate: 44.83%
```

Run 2: Report of PCC — Data Link

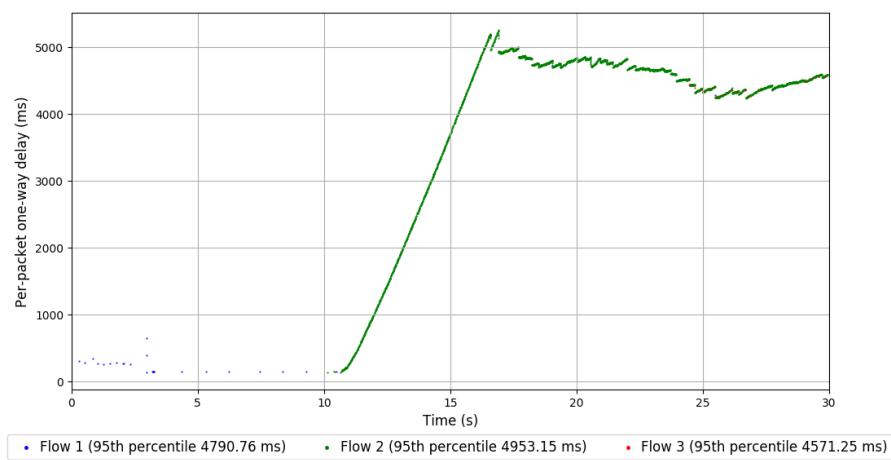
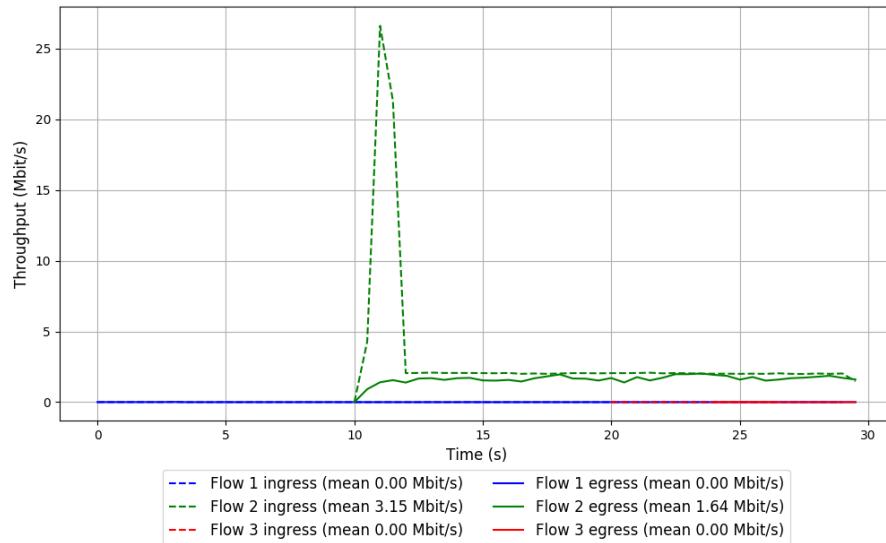


Run 3: Statistics of PCC

```
Start at: 2017-12-20 19:27:51
End at: 2017-12-20 19:28:21
Local clock offset: -0.007 ms
Remote clock offset: 10.075 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.10 Mbit/s
95th percentile per-packet one-way delay: 4952.217 ms
Loss rate: 48.07%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4790.761 ms
Loss rate: 8.98%
-- Flow 2:
Average throughput: 1.64 Mbit/s
95th percentile per-packet one-way delay: 4953.145 ms
Loss rate: 48.11%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 4571.254 ms
Loss rate: 22.41%
```

Run 3: Report of PCC — Data Link

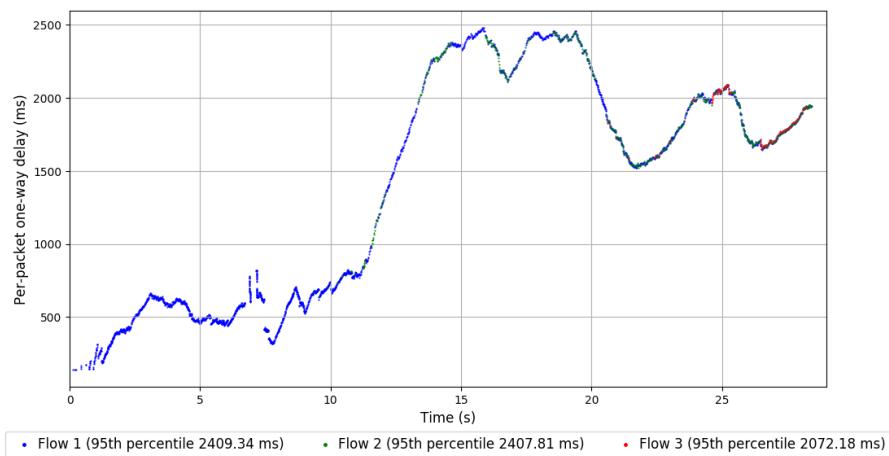
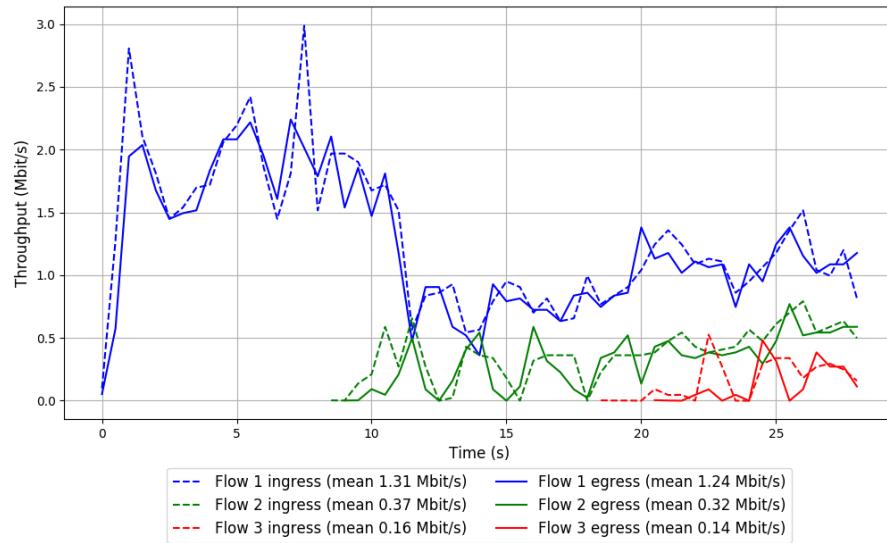


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2017-12-20 18:56:29
End at: 2017-12-20 18:56:59
Local clock offset: -0.091 ms
Remote clock offset: 11.713 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.49 Mbit/s
95th percentile per-packet one-way delay: 2407.881 ms
Loss rate: 8.01%
-- Flow 1:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 2409.335 ms
Loss rate: 5.51%
-- Flow 2:
Average throughput: 0.32 Mbit/s
95th percentile per-packet one-way delay: 2407.814 ms
Loss rate: 15.59%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 2072.181 ms
Loss rate: 31.96%
```

Run 1: Report of QUIC Cubic — Data Link

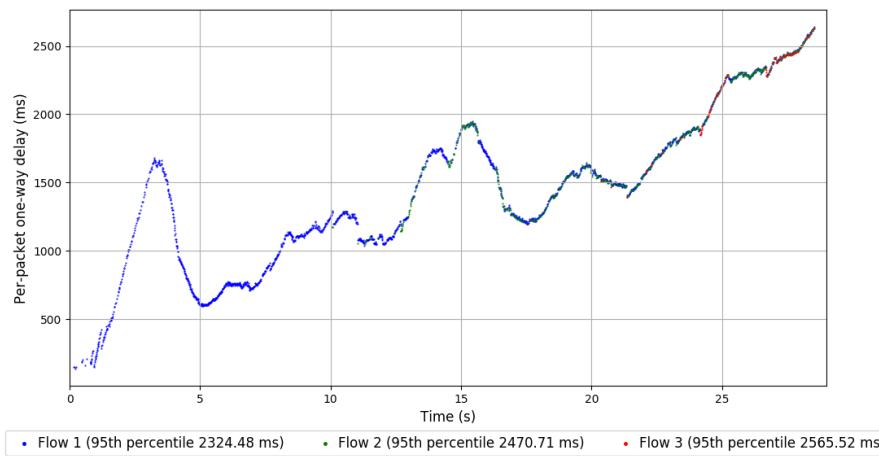
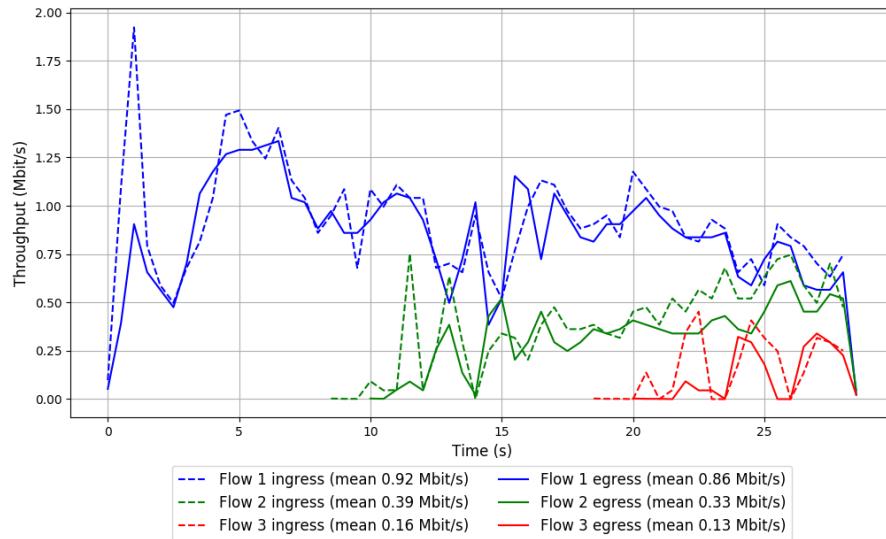


Run 2: Statistics of QUIC Cubic

```
Start at: 2017-12-20 19:15:18
End at: 2017-12-20 19:15:48
Local clock offset: -0.015 ms
Remote clock offset: 16.598 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 2426.286 ms
Loss rate: 11.41%
-- Flow 1:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 2324.476 ms
Loss rate: 7.46%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 2470.707 ms
Loss rate: 20.78%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 2565.517 ms
Loss rate: 31.77%
```

Run 2: Report of QUIC Cubic — Data Link

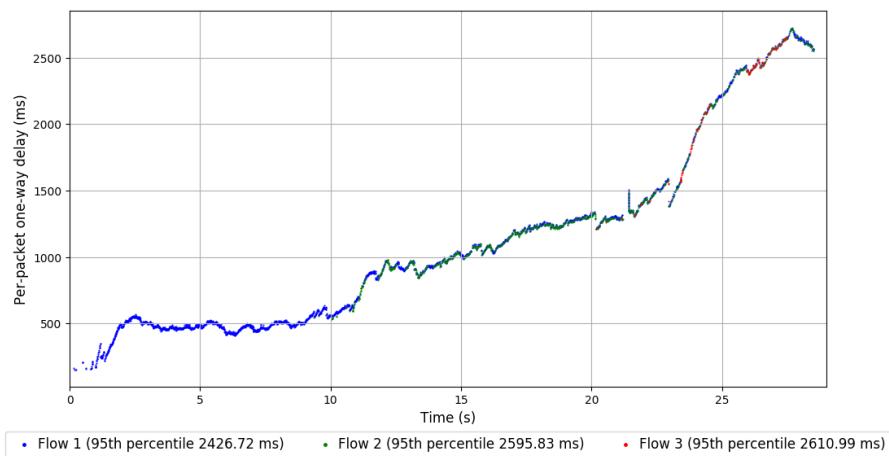
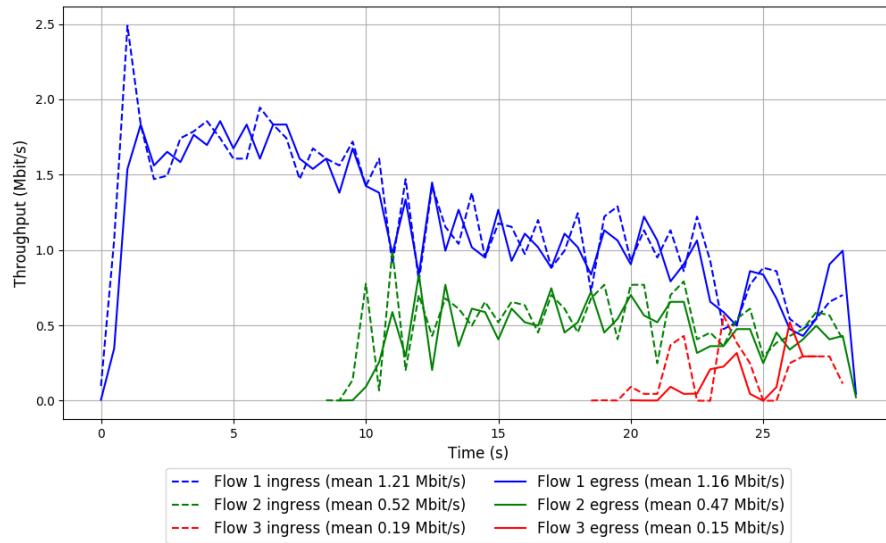


Run 3: Statistics of QUIC Cubic

```
Start at: 2017-12-20 19:34:11
End at: 2017-12-20 19:34:41
Local clock offset: -0.01 ms
Remote clock offset: 17.368 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.52 Mbit/s
95th percentile per-packet one-way delay: 2555.147 ms
Loss rate: 7.29%
-- Flow 1:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 2426.722 ms
Loss rate: 4.43%
-- Flow 2:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 2595.827 ms
Loss rate: 12.06%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 2610.993 ms
Loss rate: 36.27%
```

Run 3: Report of QUIC Cubic — Data Link

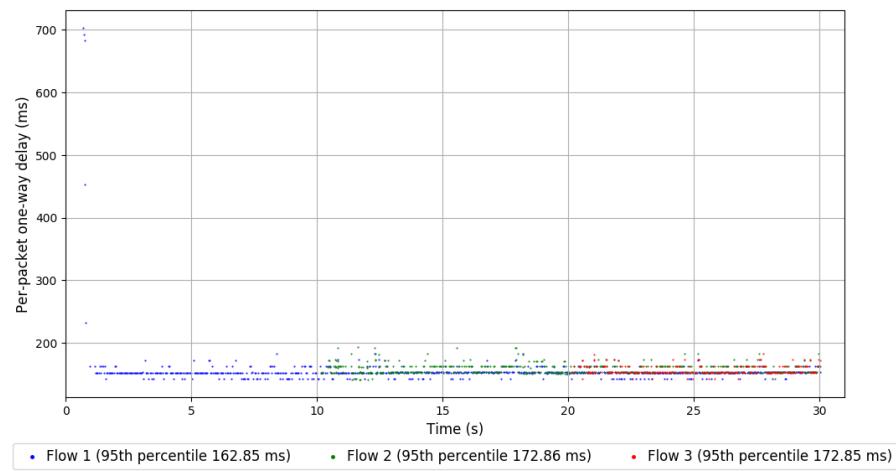
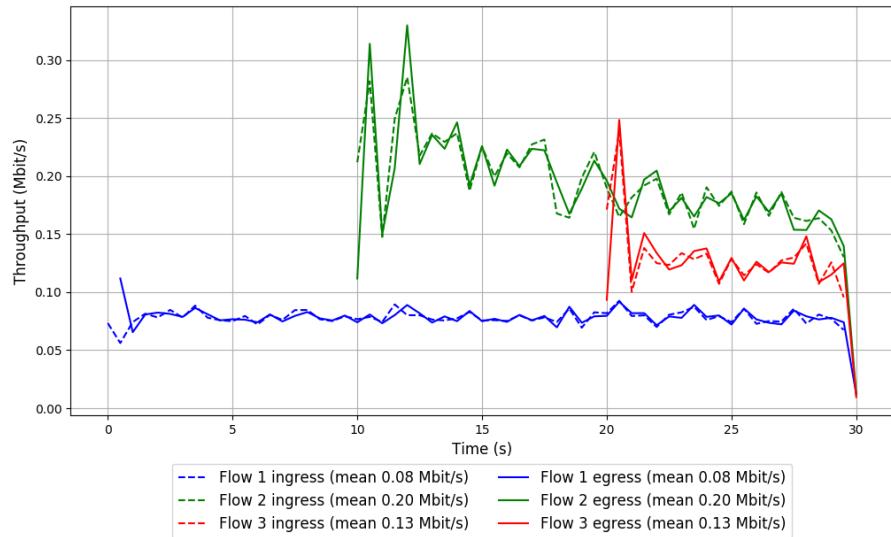


```
Run 1: Statistics of SCReAM

Start at: 2017-12-20 18:48:59
End at: 2017-12-20 18:49:29
Local clock offset: -0.032 ms
Remote clock offset: 17.762 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 172.695 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 162.848 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 172.860 ms
Loss rate: 0.46%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 172.848 ms
Loss rate: 0.34%
```

Run 1: Report of SCReAM — Data Link

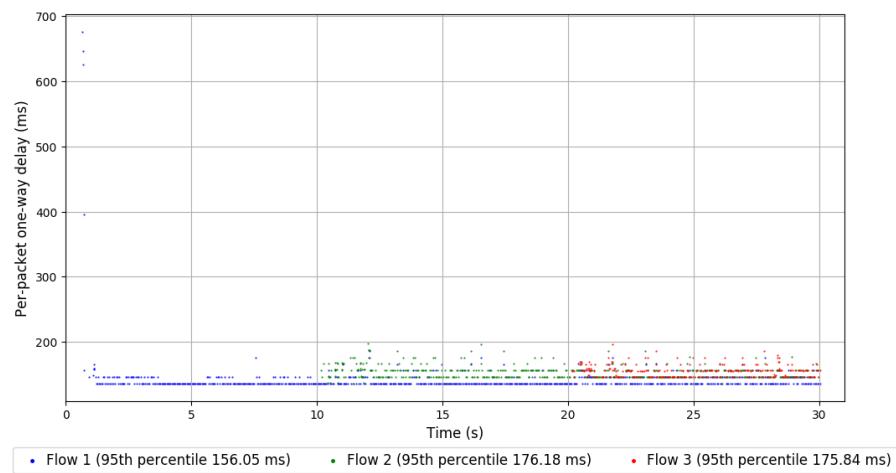
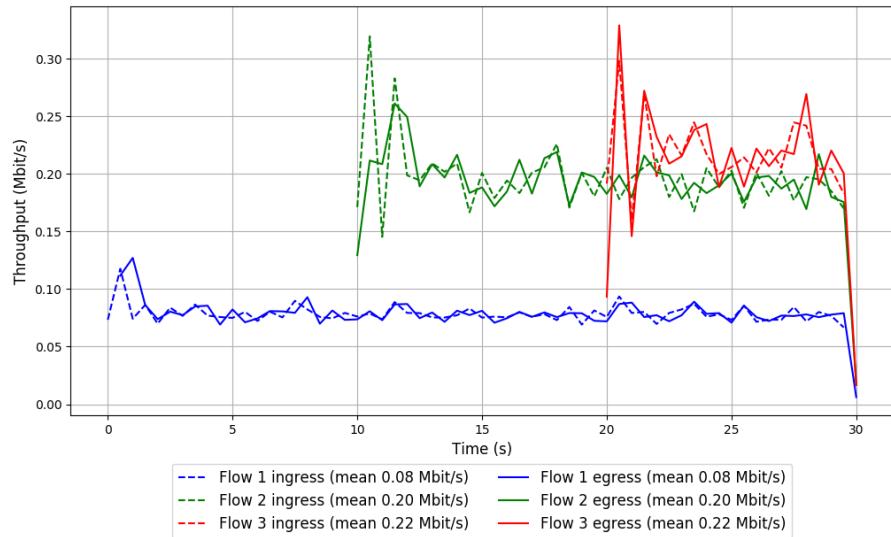


Run 2: Statistics of SCReAM

```
Start at: 2017-12-20 19:07:48
End at: 2017-12-20 19:08:18
Local clock offset: -0.011 ms
Remote clock offset: 10.786 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 166.474 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 156.047 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 176.184 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 175.835 ms
Loss rate: 0.35%
```

Run 2: Report of SCReAM — Data Link

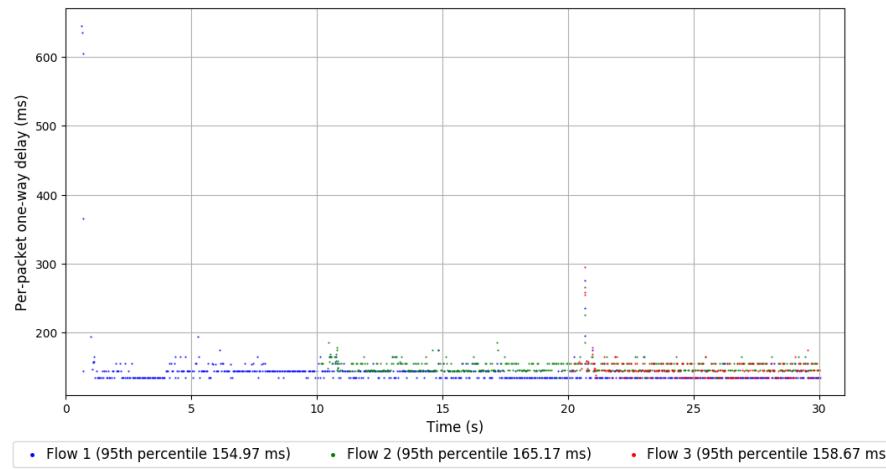
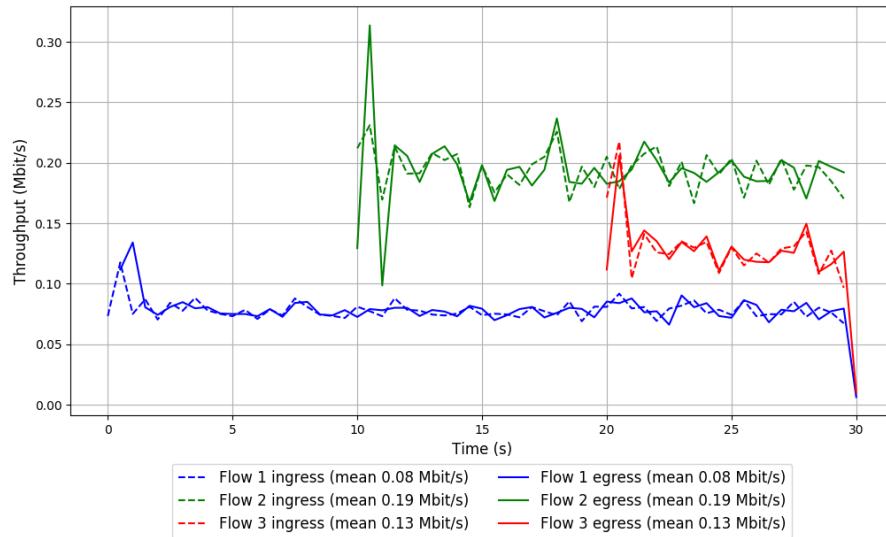


Run 3: Statistics of SCReAM

```
Start at: 2017-12-20 19:26:37
End at: 2017-12-20 19:27:07
Local clock offset: -0.022 ms
Remote clock offset: 10.305 ms

# Below is generated by plot.py at 2017-12-20 19:46:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 164.785 ms
Loss rate: 0.30%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 154.967 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 165.172 ms
Loss rate: 0.40%
-- Flow 3:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 158.674 ms
Loss rate: 0.35%
```

Run 3: Report of SCReAM — Data Link

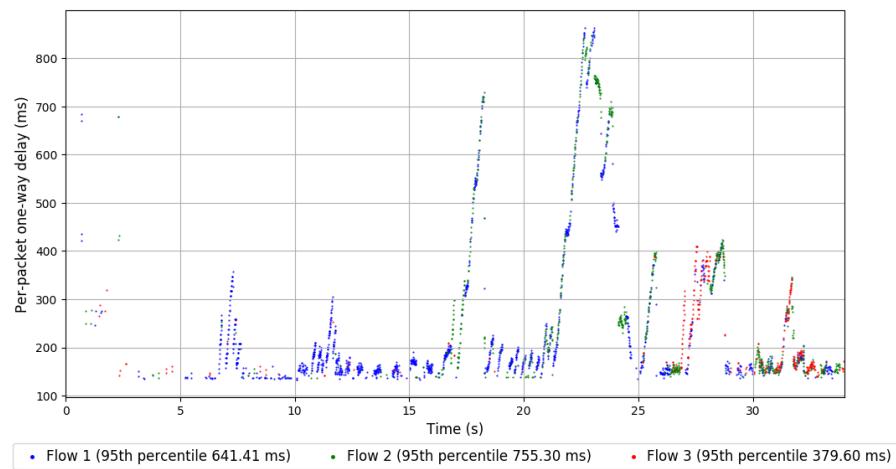
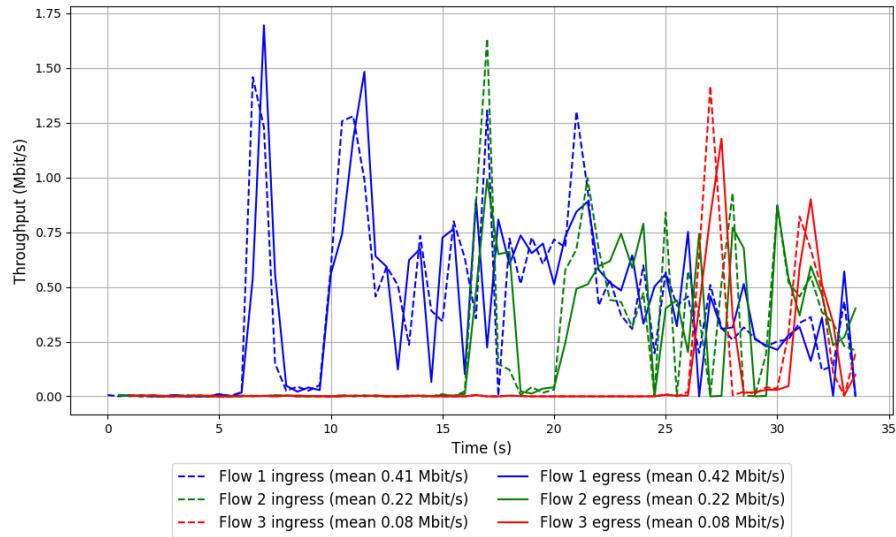


Run 1: Statistics of WebRTC media

```
Start at: 2017-12-20 18:57:44
End at: 2017-12-20 18:58:14
Local clock offset: -0.02 ms
Remote clock offset: 12.181 ms

# Below is generated by plot.py at 2017-12-20 19:46:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 701.948 ms
Loss rate: 0.29%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 641.412 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 755.297 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 379.599 ms
Loss rate: 1.75%
```

Run 1: Report of WebRTC media — Data Link

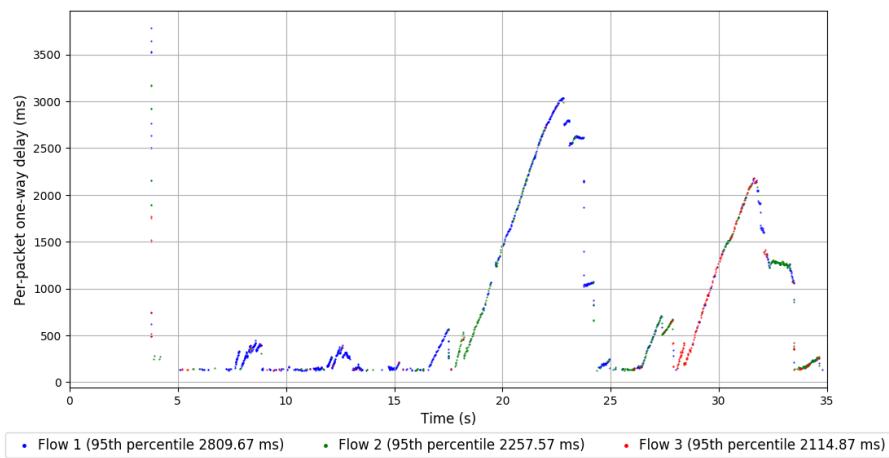
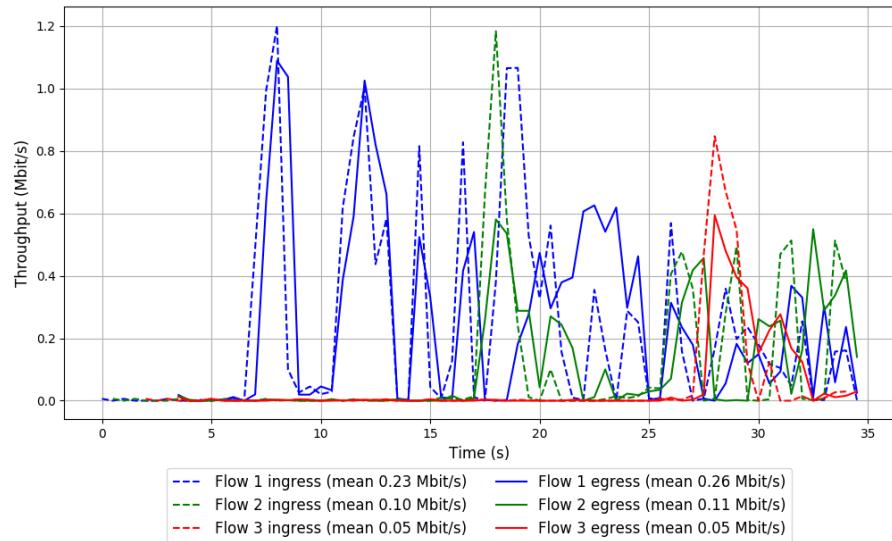


Run 2: Statistics of WebRTC media

```
Start at: 2017-12-20 19:16:34
End at: 2017-12-20 19:17:04
Local clock offset: -0.024 ms
Remote clock offset: 7.028 ms

# Below is generated by plot.py at 2017-12-20 19:46:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 2751.844 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 2809.668 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 2257.566 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 2114.871 ms
Loss rate: 0.00%
```

Run 2: Report of WebRTC media — Data Link

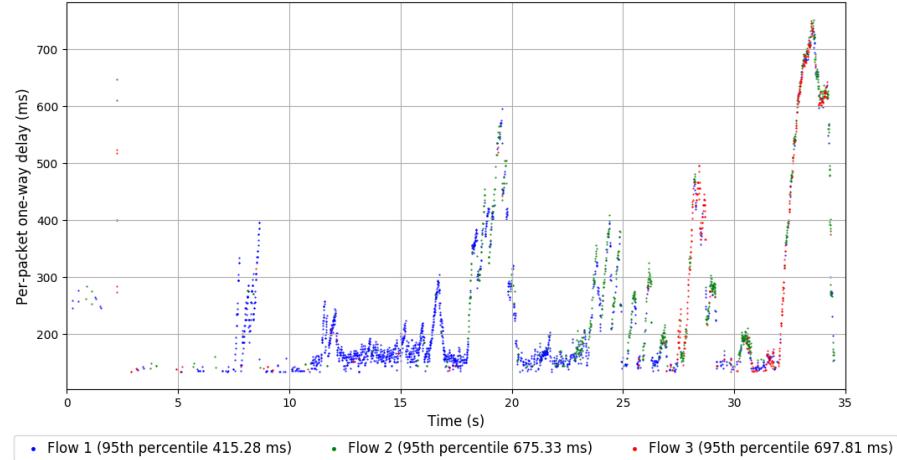
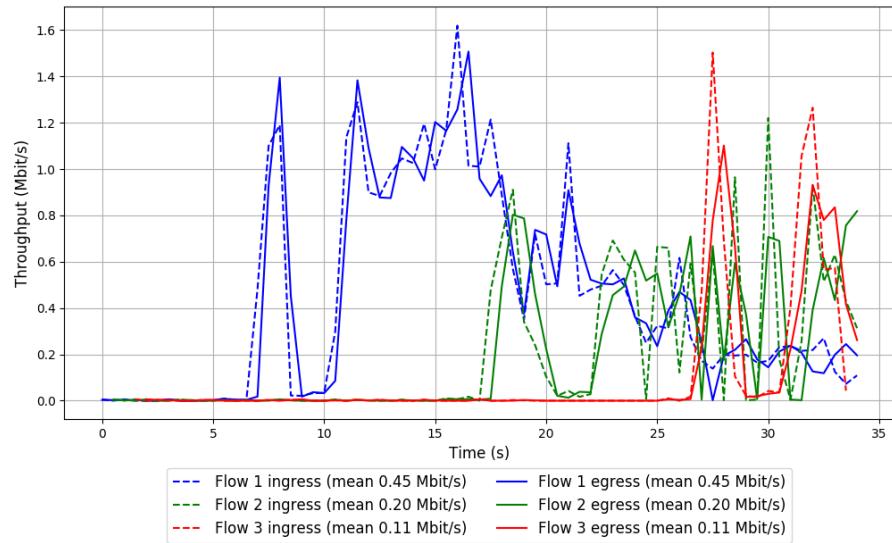


Run 3: Statistics of WebRTC media

```
Start at: 2017-12-20 19:35:26
End at: 2017-12-20 19:35:56
Local clock offset: -0.005 ms
Remote clock offset: 10.103 ms

# Below is generated by plot.py at 2017-12-20 19:46:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 636.690 ms
Loss rate: 0.17%
-- Flow 1:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 415.283 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 675.333 ms
Loss rate: 0.51%
-- Flow 3:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 697.810 ms
Loss rate: 0.00%
```

Run 3: Report of WebRTC media — Data Link

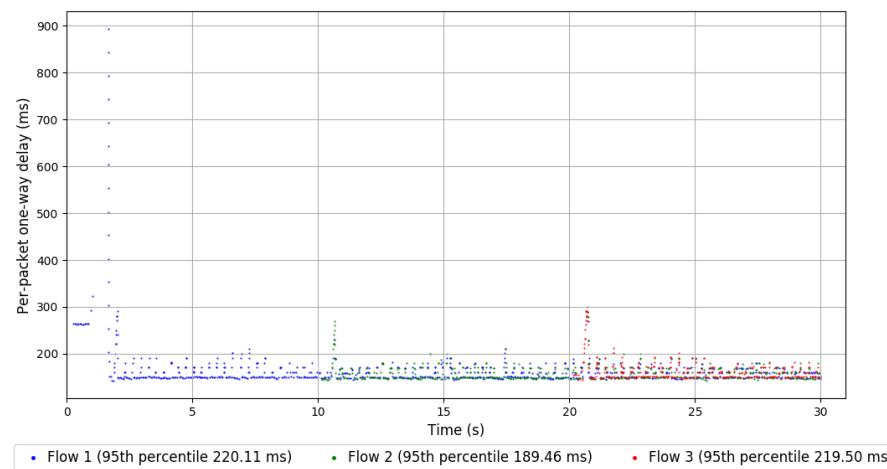
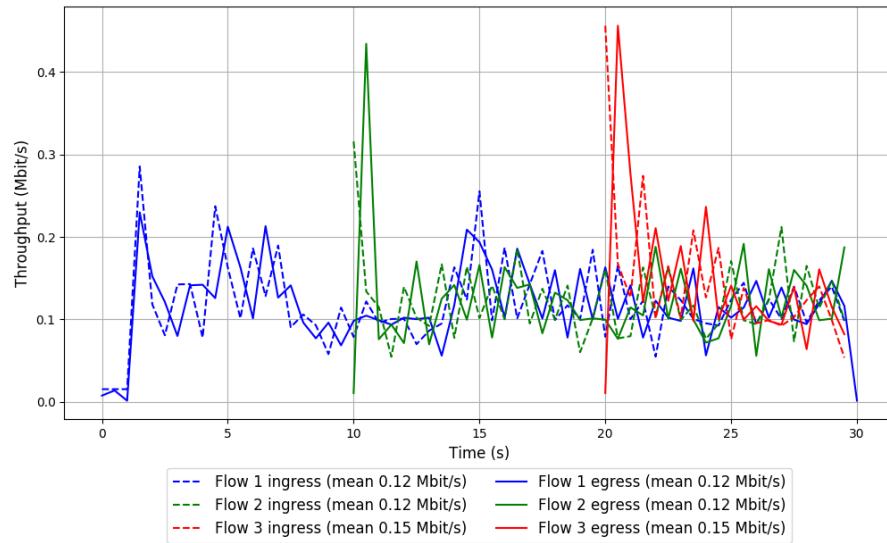


Run 1: Statistics of Sprout

```
Start at: 2017-12-20 19:05:16
End at: 2017-12-20 19:05:46
Local clock offset: -0.087 ms
Remote clock offset: 17.833 ms

# Below is generated by plot.py at 2017-12-20 19:46:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 200.957 ms
Loss rate: 0.36%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 220.107 ms
Loss rate: 0.36%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 189.464 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 219.504 ms
Loss rate: 0.05%
```

Run 1: Report of Sprout — Data Link

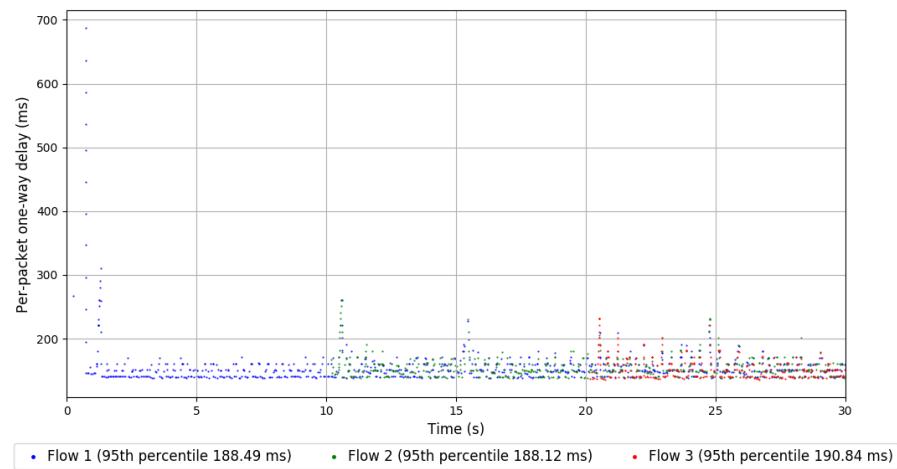
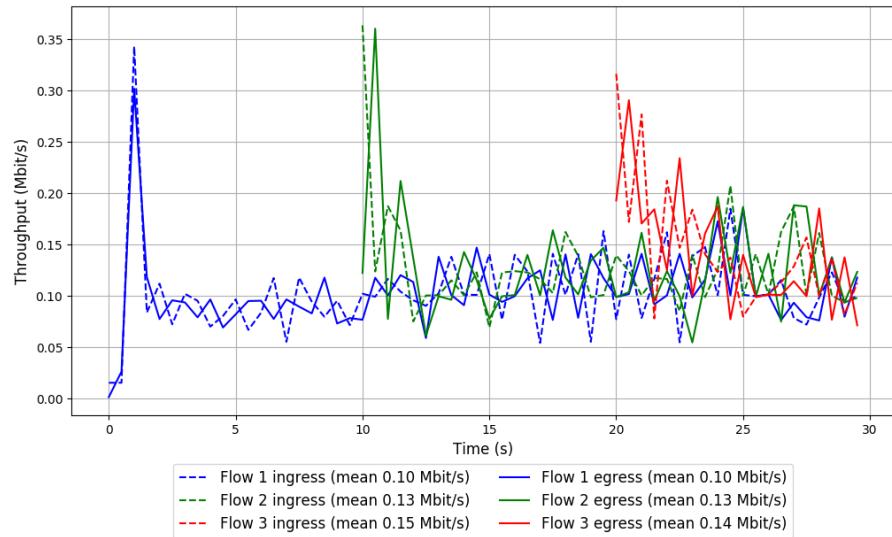


Run 2: Statistics of Sprout

```
Start at: 2017-12-20 19:24:04
End at: 2017-12-20 19:24:34
Local clock offset: -0.095 ms
Remote clock offset: 11.006 ms

# Below is generated by plot.py at 2017-12-20 19:46:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 189.860 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 188.486 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 188.118 ms
Loss rate: 0.07%
-- Flow 3:
Average throughput: 0.14 Mbit/s
95th percentile per-packet one-way delay: 190.835 ms
Loss rate: 1.70%
```

Run 2: Report of Sprout — Data Link

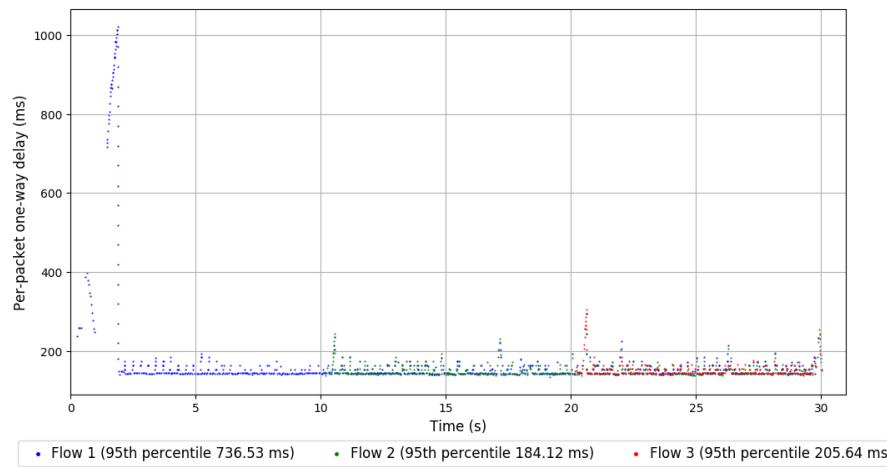
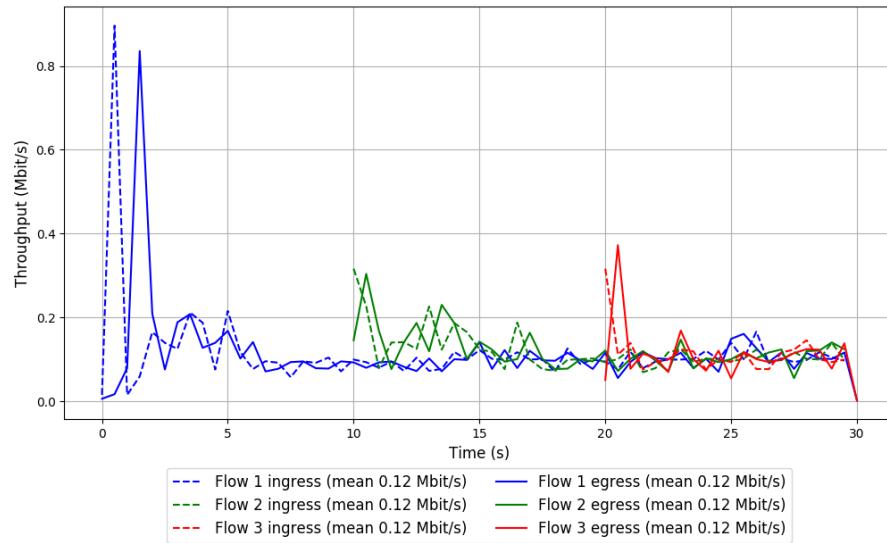


Run 3: Statistics of Sprout

```
Start at: 2017-12-20 19:42:57
End at: 2017-12-20 19:43:27
Local clock offset: -0.011 ms
Remote clock offset: 11.823 ms

# Below is generated by plot.py at 2017-12-20 19:46:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.24 Mbit/s
95th percentile per-packet one-way delay: 244.229 ms
Loss rate: 0.20%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 736.528 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 184.123 ms
Loss rate: 0.03%
-- Flow 3:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 205.641 ms
Loss rate: 0.10%
```

Run 3: Report of Sprout — Data Link

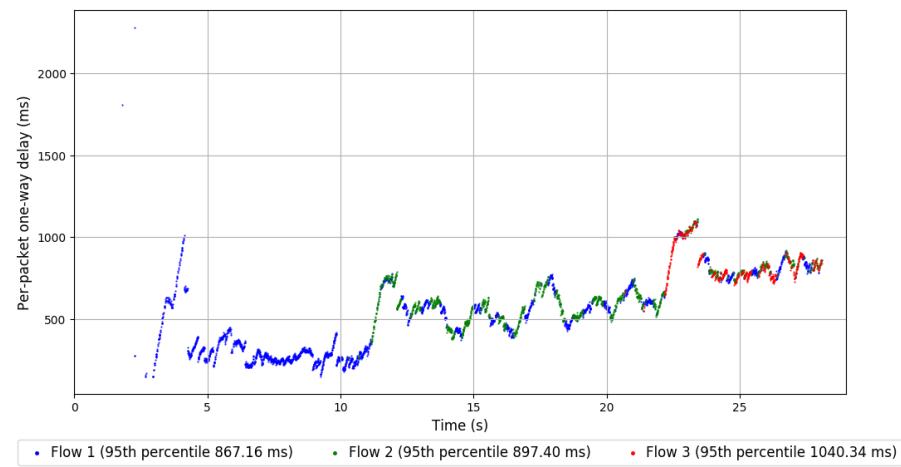
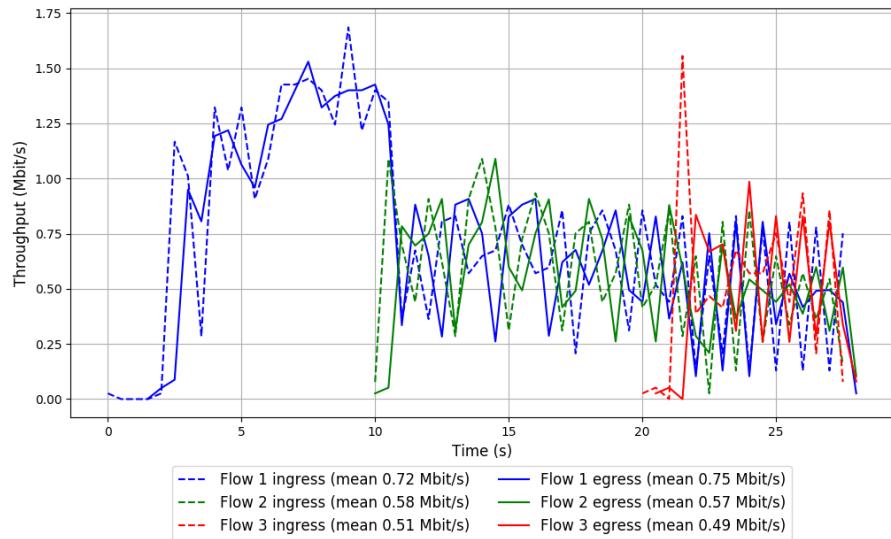


Run 1: Statistics of TaoVA-100x

```
Start at: 2017-12-20 18:59:00
End at: 2017-12-20 18:59:30
Local clock offset: -0.027 ms
Remote clock offset: 16.526 ms

# Below is generated by plot.py at 2017-12-20 19:46:07
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.28 Mbit/s
95th percentile per-packet one-way delay: 910.230 ms
Loss rate: 2.78%
-- Flow 1:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 867.160 ms
Loss rate: 2.13%
-- Flow 2:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 897.403 ms
Loss rate: 1.62%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1040.343 ms
Loss rate: 9.07%
```

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

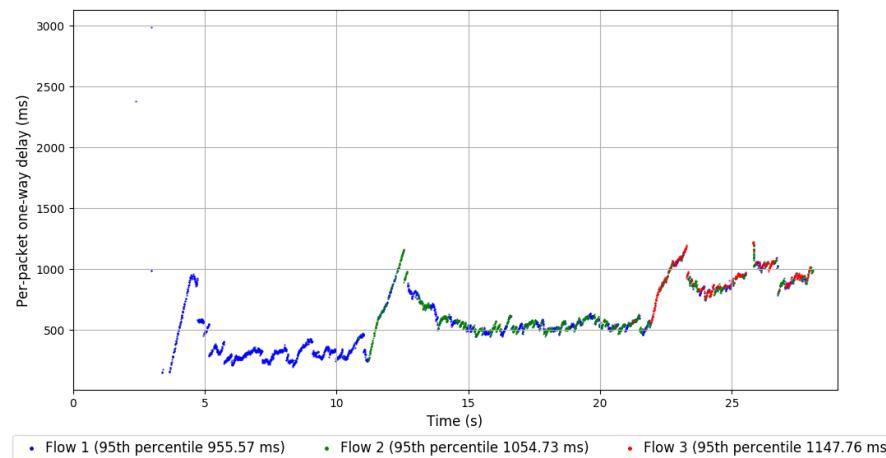
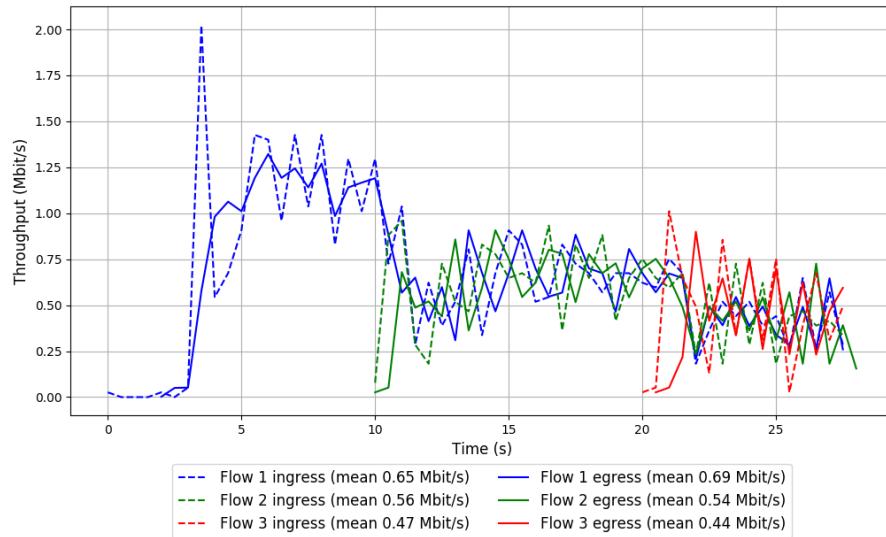


Run 2: Statistics of TaoVA-100x

```
Start at: 2017-12-20 19:17:48
End at: 2017-12-20 19:18:18
Local clock offset: -0.023 ms
Remote clock offset: 14.948 ms

# Below is generated by plot.py at 2017-12-20 19:46:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.19 Mbit/s
95th percentile per-packet one-way delay: 1046.214 ms
Loss rate: 3.60%
-- Flow 1:
Average throughput: 0.69 Mbit/s
95th percentile per-packet one-way delay: 955.567 ms
Loss rate: 2.43%
-- Flow 2:
Average throughput: 0.54 Mbit/s
95th percentile per-packet one-way delay: 1054.730 ms
Loss rate: 2.99%
-- Flow 3:
Average throughput: 0.44 Mbit/s
95th percentile per-packet one-way delay: 1147.760 ms
Loss rate: 11.07%
```

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

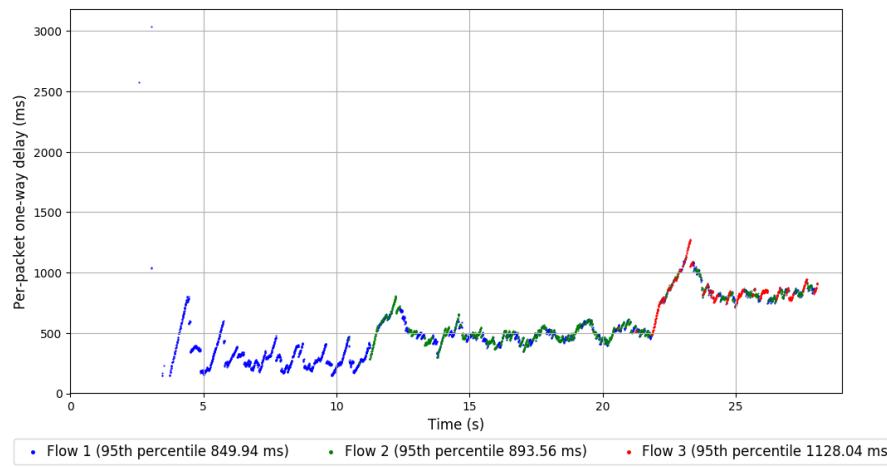
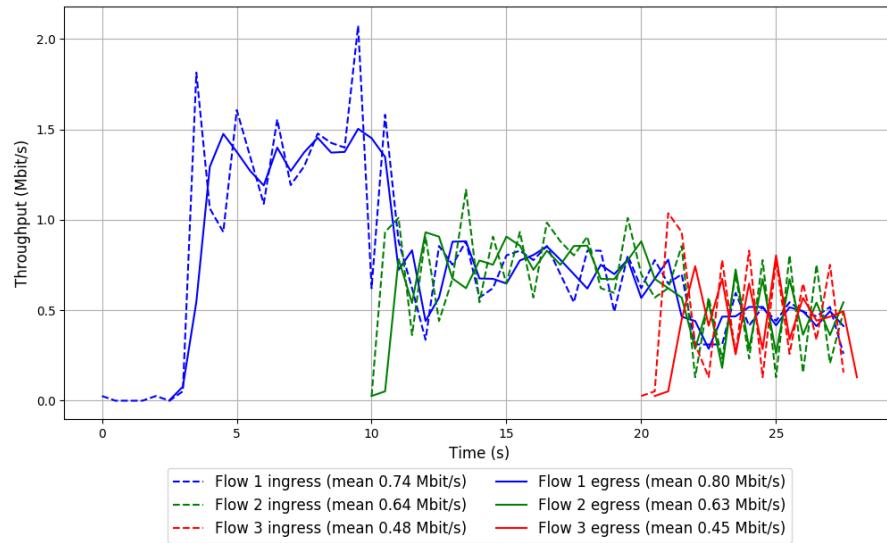


Run 3: Statistics of TaoVA-100x

```
Start at: 2017-12-20 19:36:41
End at: 2017-12-20 19:37:11
Local clock offset: -0.07 ms
Remote clock offset: 15.068 ms

# Below is generated by plot.py at 2017-12-20 19:46:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.37 Mbit/s
95th percentile per-packet one-way delay: 893.821 ms
Loss rate: 2.82%
-- Flow 1:
Average throughput: 0.80 Mbit/s
95th percentile per-packet one-way delay: 849.938 ms
Loss rate: 1.69%
-- Flow 2:
Average throughput: 0.63 Mbit/s
95th percentile per-packet one-way delay: 893.556 ms
Loss rate: 3.06%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 1128.035 ms
Loss rate: 8.39%
```

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

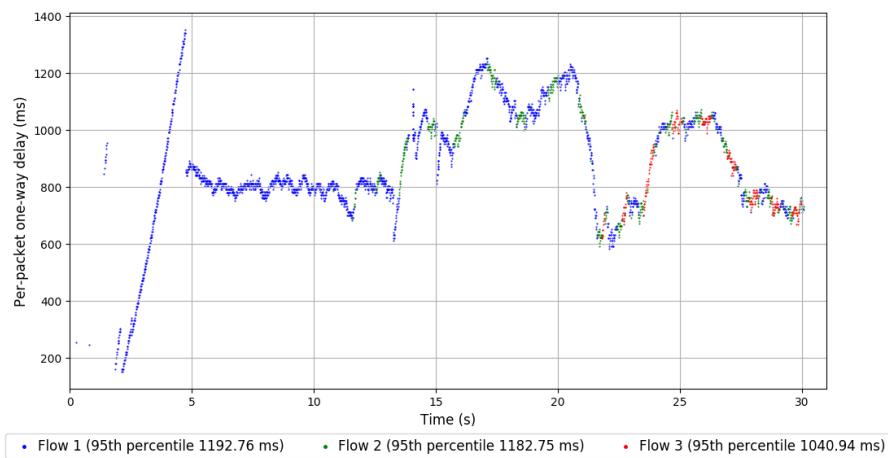
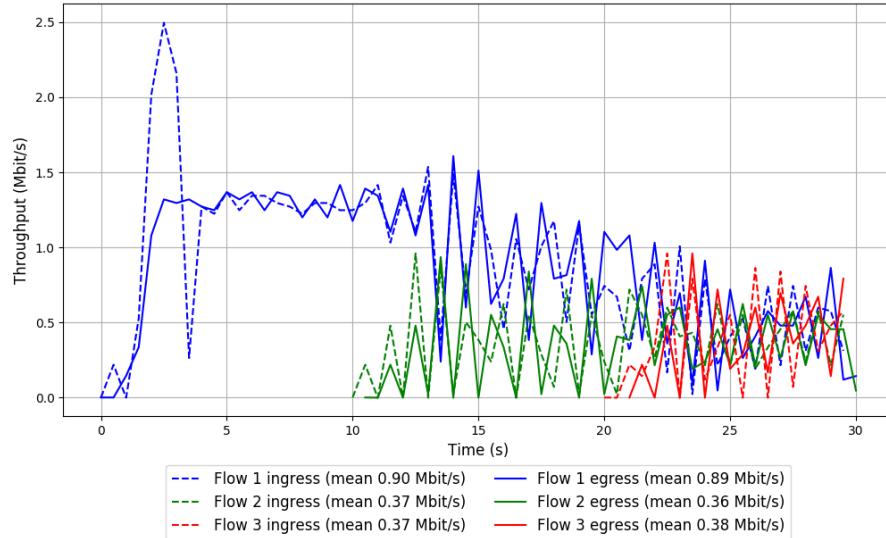


Run 1: Statistics of TCP Vegas

```
Start at: 2017-12-20 19:04:02
End at: 2017-12-20 19:04:32
Local clock offset: -0.073 ms
Remote clock offset: 10.84 ms

# Below is generated by plot.py at 2017-12-20 19:46:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.24 Mbit/s
95th percentile per-packet one-way delay: 1182.926 ms
Loss rate: 2.41%
-- Flow 1:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 1192.759 ms
Loss rate: 1.25%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 1182.748 ms
Loss rate: 3.97%
-- Flow 3:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 1040.939 ms
Loss rate: 7.84%
```

Run 1: Report of TCP Vegas — Data Link

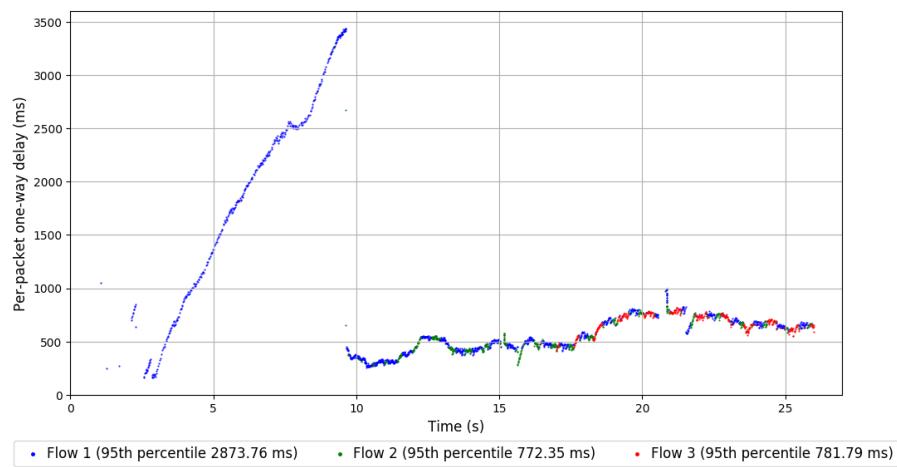
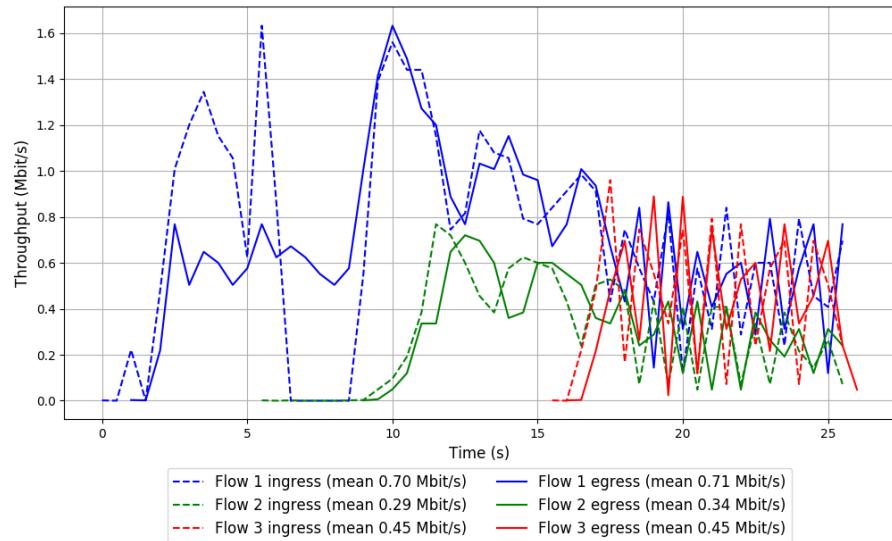


Run 2: Statistics of TCP Vegas

```
Start at: 2017-12-20 19:22:50
End at: 2017-12-20 19:23:20
Local clock offset: -0.018 ms
Remote clock offset: 9.955 ms

# Below is generated by plot.py at 2017-12-20 19:46:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.11 Mbit/s
95th percentile per-packet one-way delay: 2523.734 ms
Loss rate: 2.20%
-- Flow 1:
Average throughput: 0.71 Mbit/s
95th percentile per-packet one-way delay: 2873.758 ms
Loss rate: 1.93%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 772.346 ms
Loss rate: 0.83%
-- Flow 3:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 781.792 ms
Loss rate: 5.08%
```

Run 2: Report of TCP Vegas — Data Link

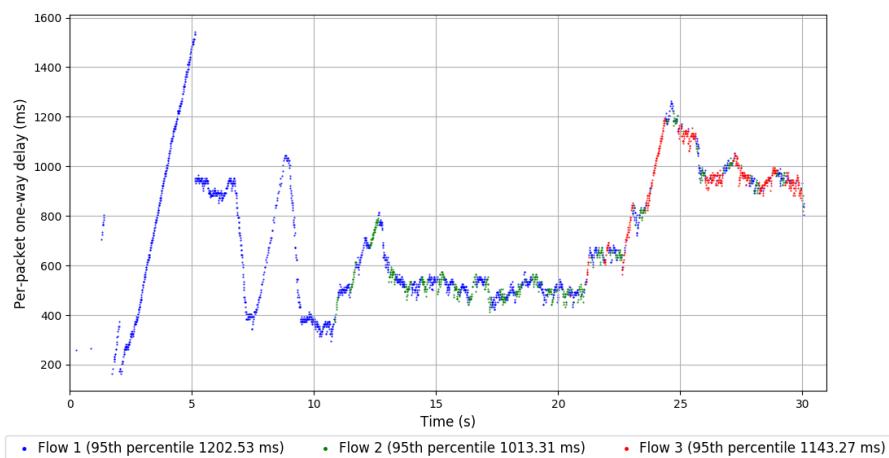
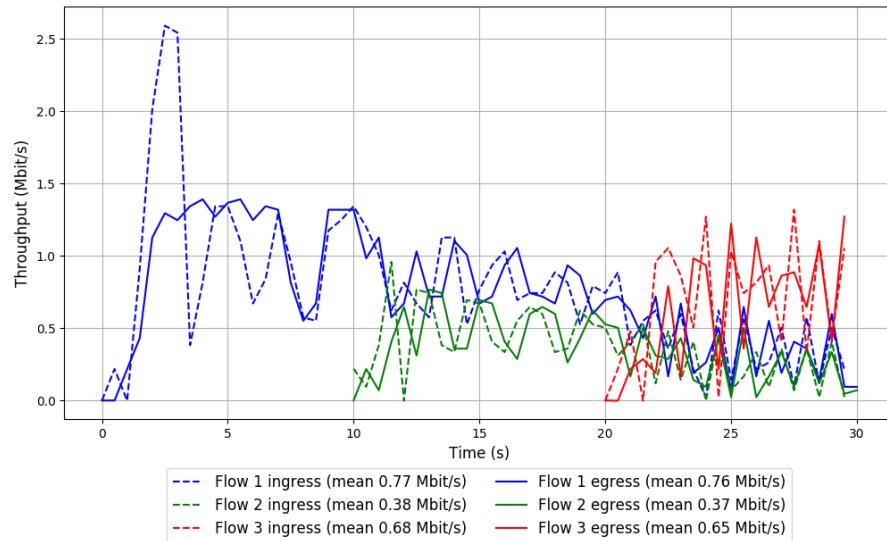


Run 3: Statistics of TCP Vegas

```
Start at: 2017-12-20 19:41:42
End at: 2017-12-20 19:42:12
Local clock offset: -0.03 ms
Remote clock offset: 11.192 ms

# Below is generated by plot.py at 2017-12-20 19:46:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 1163.345 ms
Loss rate: 2.91%
-- Flow 1:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 1202.529 ms
Loss rate: 1.31%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 1013.314 ms
Loss rate: 2.09%
-- Flow 3:
Average throughput: 0.65 Mbit/s
95th percentile per-packet one-way delay: 1143.270 ms
Loss rate: 9.20%
```

Run 3: Report of TCP Vegas — Data Link

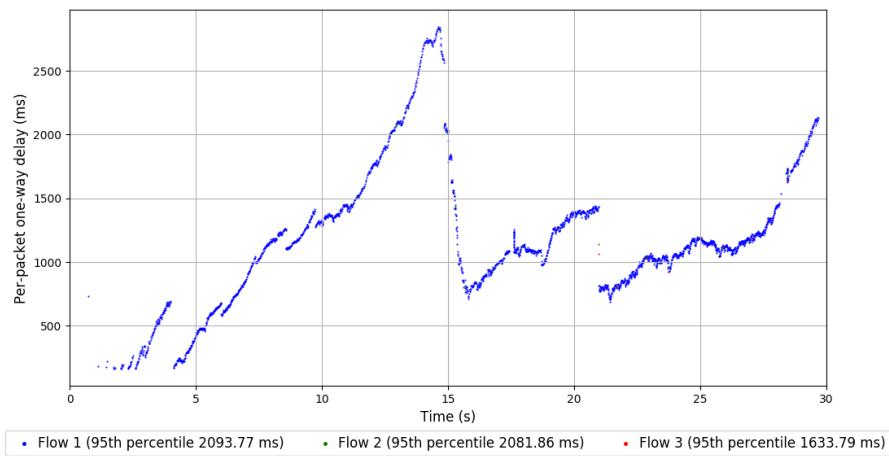
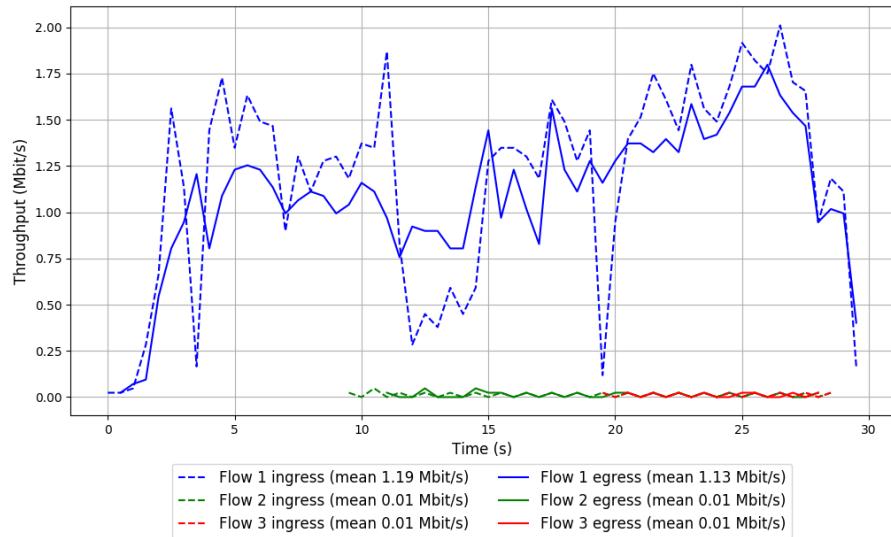


Run 1: Statistics of Verus

```
Start at: 2017-12-20 18:51:29
End at: 2017-12-20 18:51:59
Local clock offset: -0.087 ms
Remote clock offset: 10.815 ms

# Below is generated by plot.py at 2017-12-20 19:46:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.14 Mbit/s
95th percentile per-packet one-way delay: 2093.774 ms
Loss rate: 7.08%
-- Flow 1:
Average throughput: 1.13 Mbit/s
95th percentile per-packet one-way delay: 2093.774 ms
Loss rate: 7.02%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2081.860 ms
Loss rate: 9.52%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1633.789 ms
Loss rate: 20.00%
```

Run 1: Report of Verus — Data Link

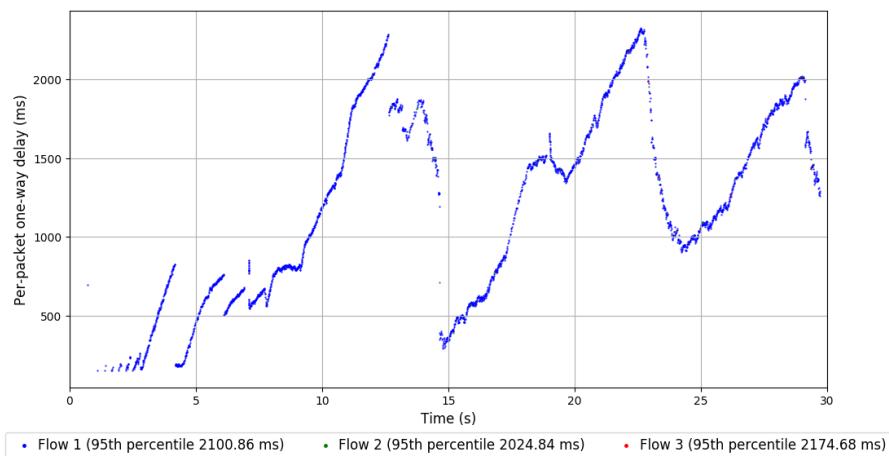
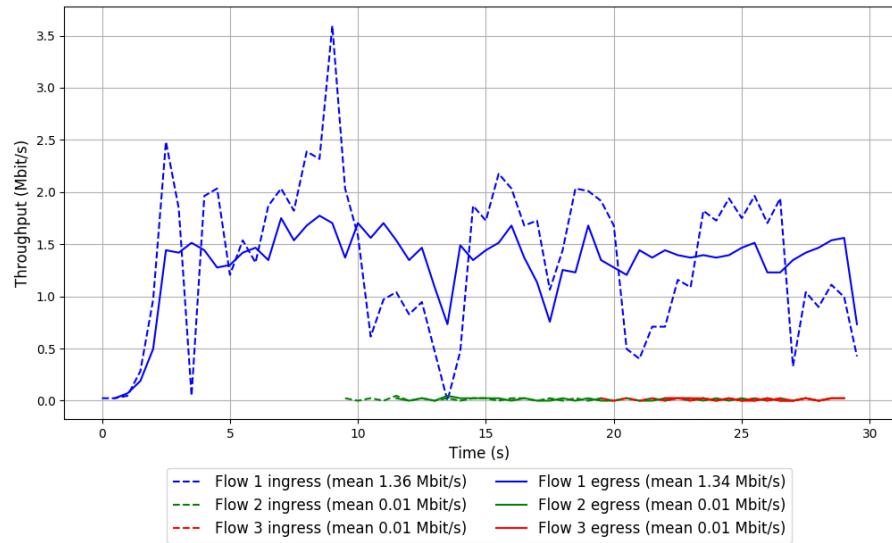


Run 2: Statistics of Verus

```
Start at: 2017-12-20 19:10:18
End at: 2017-12-20 19:10:48
Local clock offset: -0.068 ms
Remote clock offset: 9.776 ms

# Below is generated by plot.py at 2017-12-20 19:46:11
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.35 Mbit/s
95th percentile per-packet one-way delay: 2100.863 ms
Loss rate: 3.21%
-- Flow 1:
Average throughput: 1.34 Mbit/s
95th percentile per-packet one-way delay: 2100.863 ms
Loss rate: 3.18%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2024.843 ms
Loss rate: 4.55%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2174.678 ms
Loss rate: 10.00%
```

Run 2: Report of Verus — Data Link

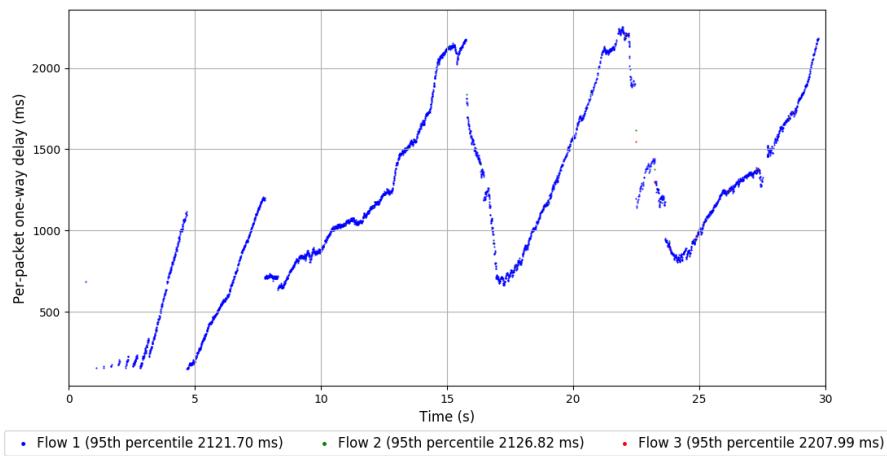
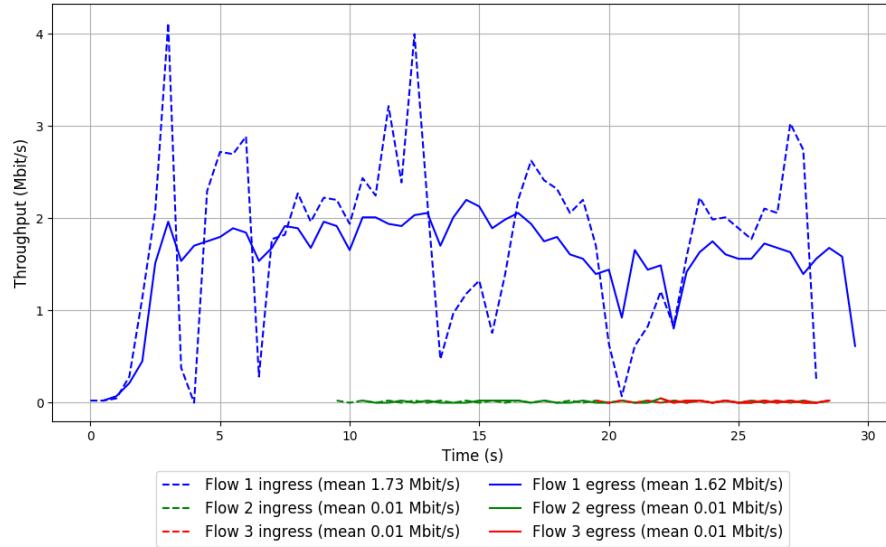


Run 3: Statistics of Verus

```
Start at: 2017-12-20 19:29:06
End at: 2017-12-20 19:29:36
Local clock offset: -0.005 ms
Remote clock offset: 15.026 ms

# Below is generated by plot.py at 2017-12-20 19:46:12
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.63 Mbit/s
95th percentile per-packet one-way delay: 2122.118 ms
Loss rate: 3.10%
-- Flow 1:
Average throughput: 1.62 Mbit/s
95th percentile per-packet one-way delay: 2121.698 ms
Loss rate: 3.02%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2126.824 ms
Loss rate: 10.00%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 2207.994 ms
Loss rate: 20.00%
```

Run 3: Report of Verus — Data Link

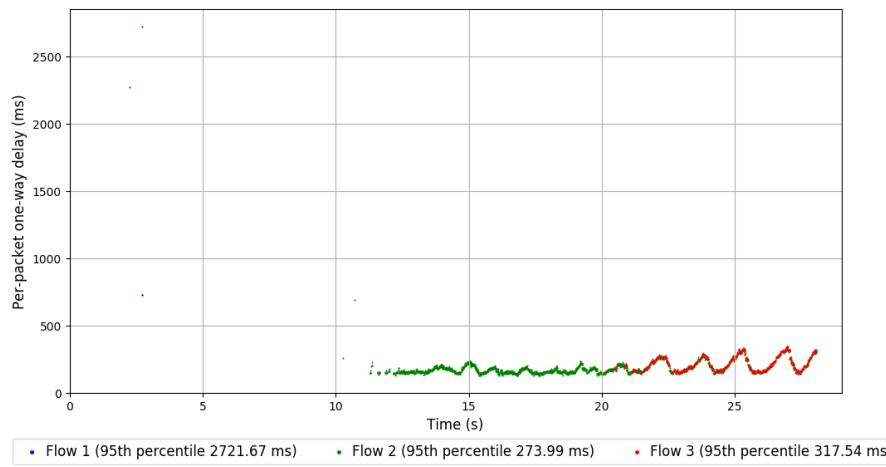
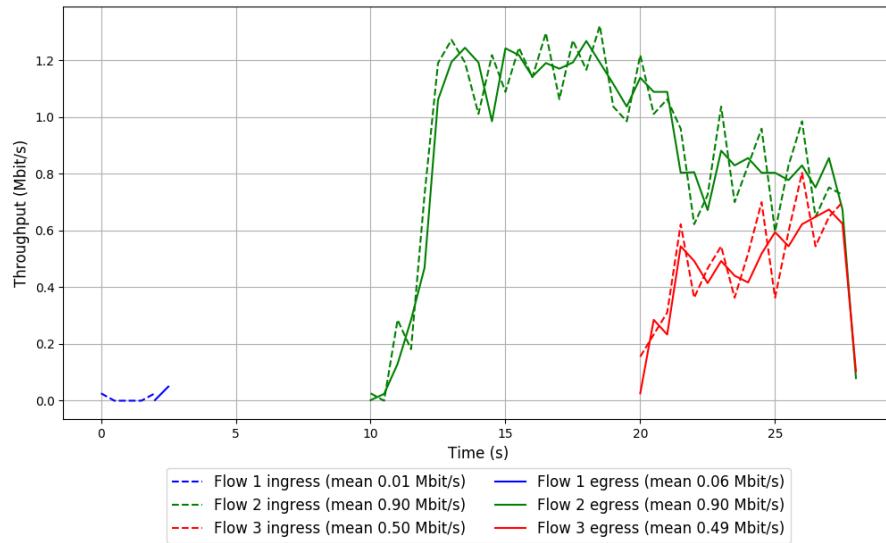


Run 1: Statistics of Copa

```
Start at: 2017-12-20 18:55:14
End at: 2017-12-20 18:55:44
Local clock offset: -0.018 ms
Remote clock offset: 11.268 ms

# Below is generated by plot.py at 2017-12-20 19:46:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.77 Mbit/s
95th percentile per-packet one-way delay: 298.977 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 2721.667 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.90 Mbit/s
95th percentile per-packet one-way delay: 273.986 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 317.537 ms
Loss rate: 3.24%
```

Run 1: Report of Copa — Data Link

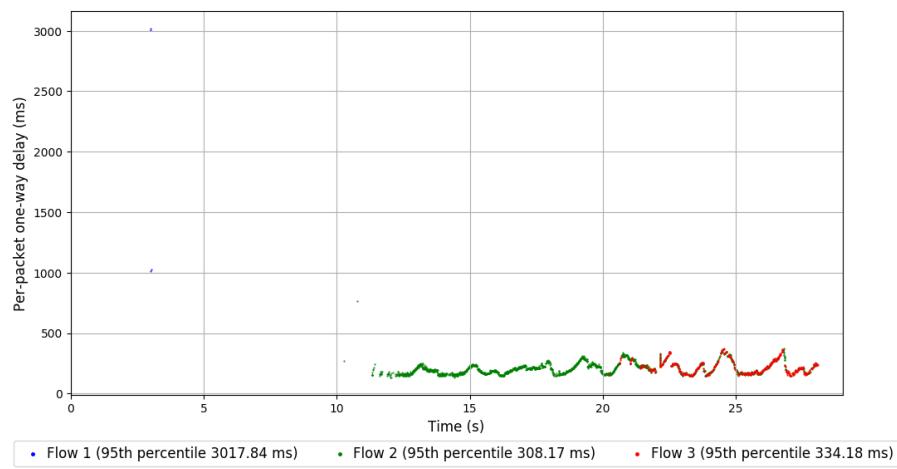
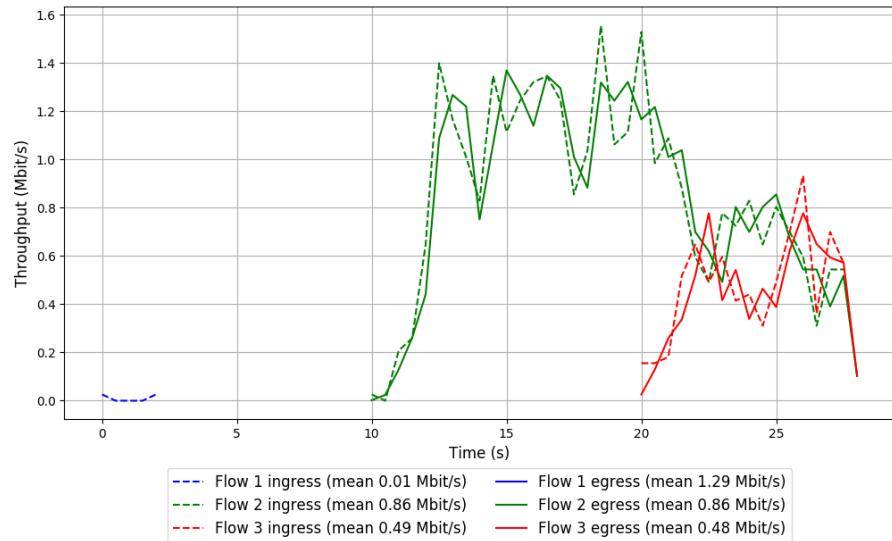


Run 2: Statistics of Copa

```
Start at: 2017-12-20 19:14:03
End at: 2017-12-20 19:14:33
Local clock offset: -0.006 ms
Remote clock offset: 17.056 ms

# Below is generated by plot.py at 2017-12-20 19:46:13
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 313.341 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 1.29 Mbit/s
95th percentile per-packet one-way delay: 3017.835 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.86 Mbit/s
95th percentile per-packet one-way delay: 308.171 ms
Loss rate: 0.68%
-- Flow 3:
Average throughput: 0.48 Mbit/s
95th percentile per-packet one-way delay: 334.184 ms
Loss rate: 2.00%
```

Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

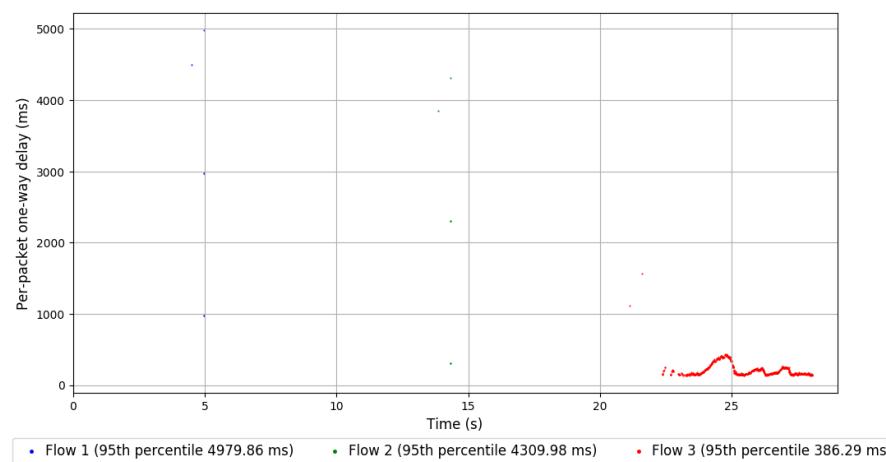
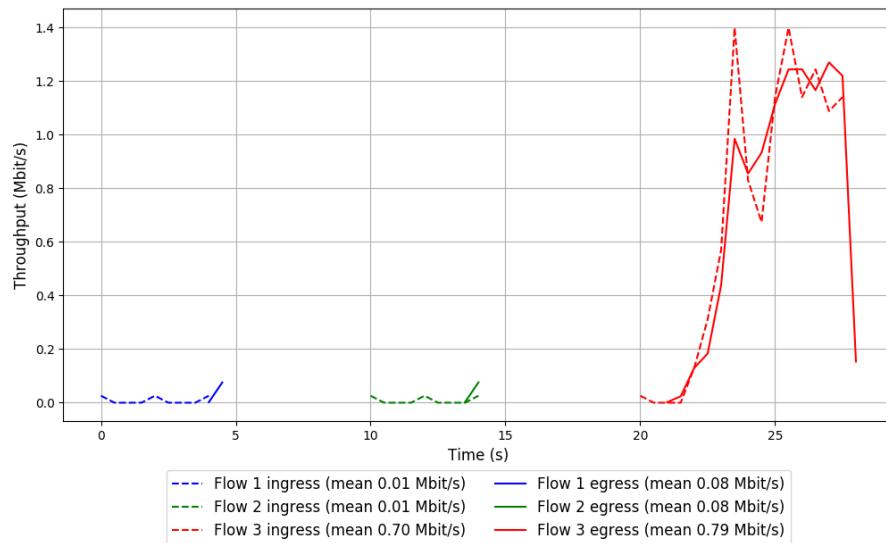
Start at: 2017-12-20 19:32:56

End at: 2017-12-20 19:33:26

Local clock offset: -0.008 ms

Remote clock offset: 8.587 ms

Run 3: Report of Copa — Data Link

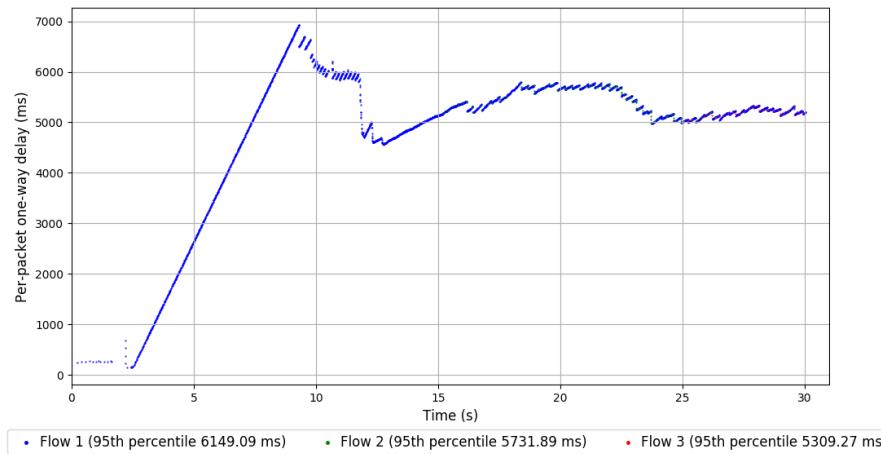
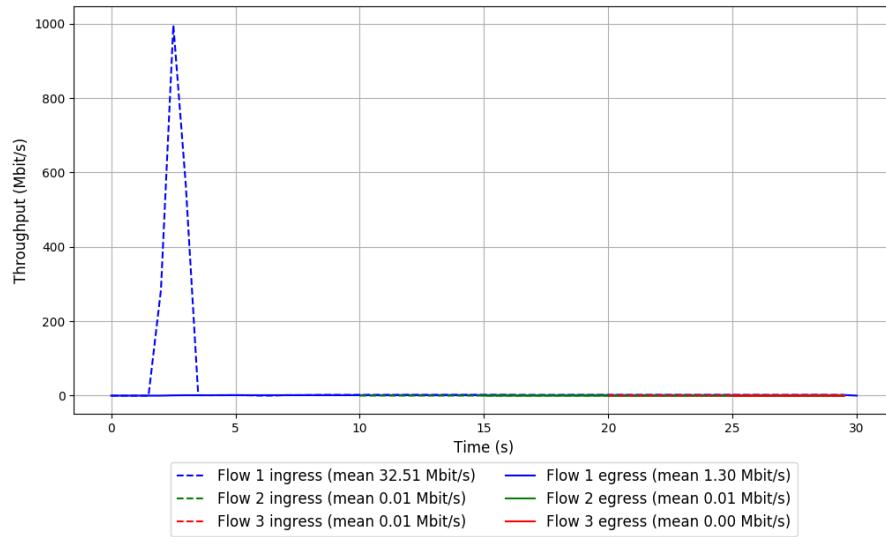


```
Run 1: Statistics of FillP
```

```
Start at: 2017-12-20 19:06:32
End at: 2017-12-20 19:07:02
Local clock offset: -0.008 ms
Remote clock offset: 11.264 ms

# Below is generated by plot.py at 2017-12-20 19:46:17
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 6130.533 ms
Loss rate: 96.02%
-- Flow 1:
Average throughput: 1.30 Mbit/s
95th percentile per-packet one-way delay: 6149.086 ms
Loss rate: 96.03%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 5731.887 ms
Loss rate: 10.62%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5309.272 ms
Loss rate: 75.49%
```

Run 1: Report of FillP — Data Link

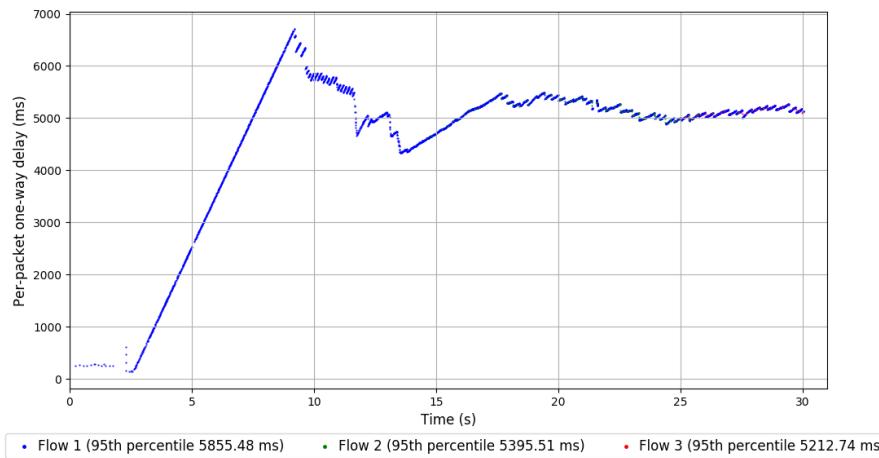
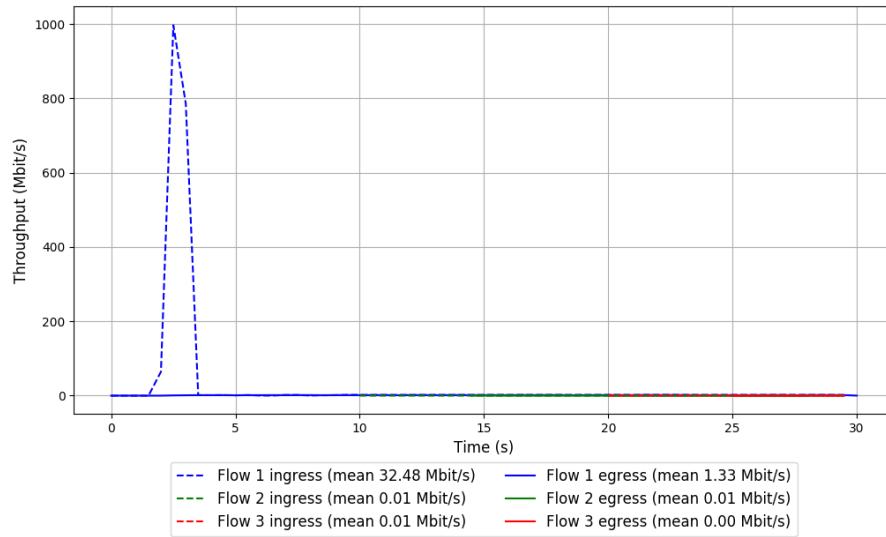


Run 2: Statistics of FillP

```
Start at: 2017-12-20 19:25:20
End at: 2017-12-20 19:25:50
Local clock offset: -0.007 ms
Remote clock offset: 11.27 ms

# Below is generated by plot.py at 2017-12-20 19:46:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 5845.724 ms
Loss rate: 95.92%
-- Flow 1:
Average throughput: 1.33 Mbit/s
95th percentile per-packet one-way delay: 5855.484 ms
Loss rate: 95.93%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 5395.511 ms
Loss rate: 11.99%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 5212.741 ms
Loss rate: 76.08%
```

Run 2: Report of FillP — Data Link

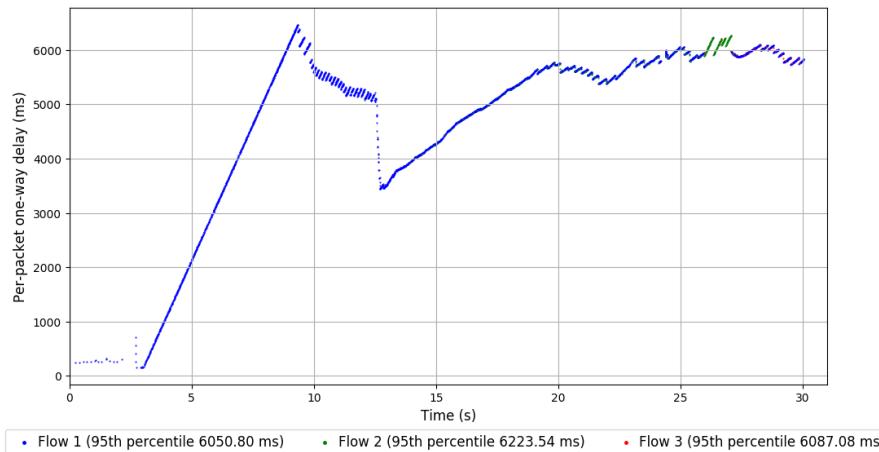
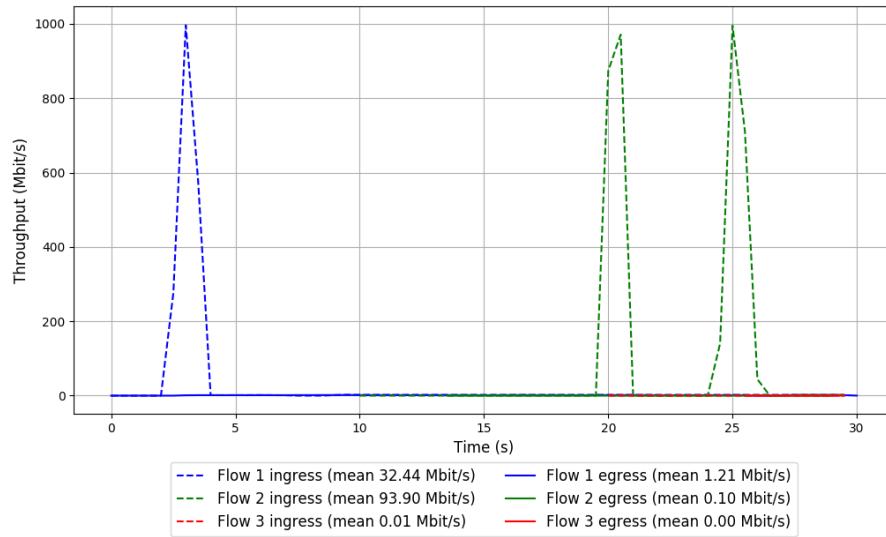


Run 3: Statistics of FillP

```
Start at: 2017-12-20 19:44:13
End at: 2017-12-20 19:44:43
Local clock offset: 0.004 ms
Remote clock offset: 14.745 ms

# Below is generated by plot.py at 2017-12-20 19:46:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.26 Mbit/s
95th percentile per-packet one-way delay: 6094.522 ms
Loss rate: 98.68%
-- Flow 1:
Average throughput: 1.21 Mbit/s
95th percentile per-packet one-way delay: 6050.796 ms
Loss rate: 96.30%
-- Flow 2:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 6223.541 ms
Loss rate: 99.92%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 6087.083 ms
Loss rate: 80.31%
```

Run 3: Report of FillP — Data Link

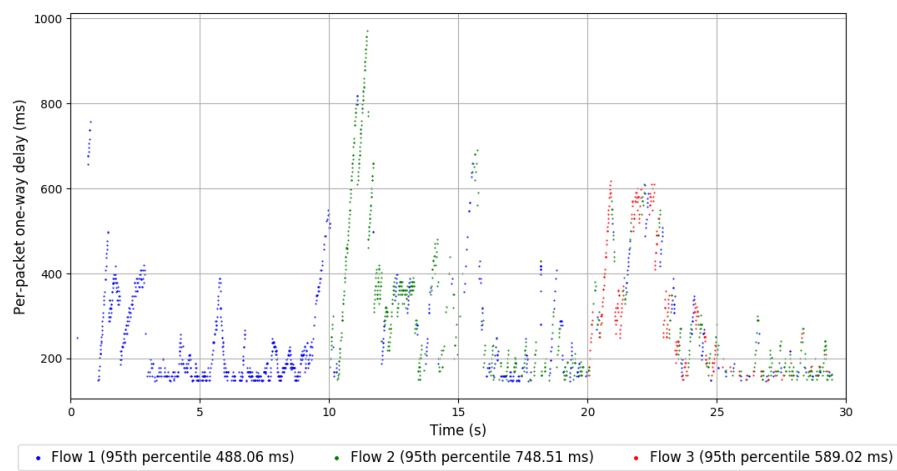
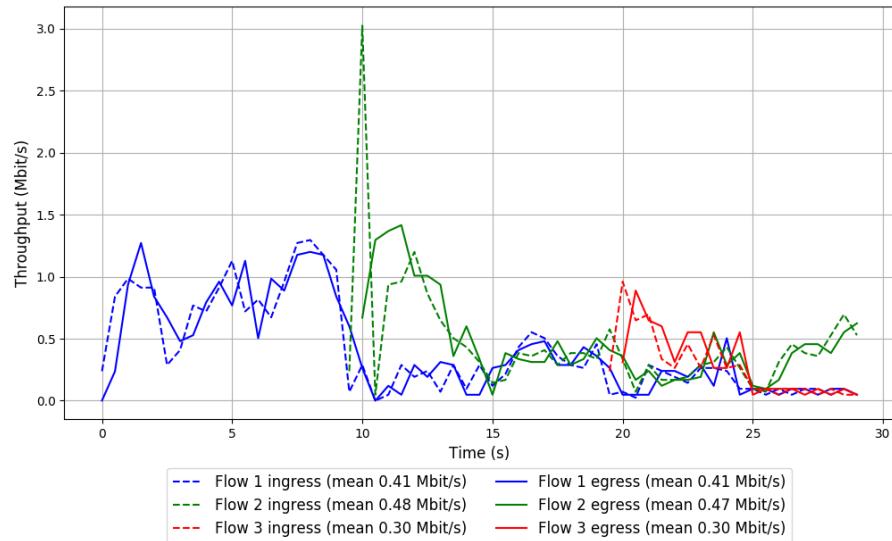


Run 1: Statistics of Indigo

```
Start at: 2017-12-20 19:00:17
End at: 2017-12-20 19:00:47
Local clock offset: -0.021 ms
Remote clock offset: 11.653 ms

# Below is generated by plot.py at 2017-12-20 19:46:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.81 Mbit/s
95th percentile per-packet one-way delay: 628.523 ms
Loss rate: 0.70%
-- Flow 1:
Average throughput: 0.41 Mbit/s
95th percentile per-packet one-way delay: 488.065 ms
Loss rate: 0.30%
-- Flow 2:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 748.513 ms
Loss rate: 1.42%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 589.020 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link

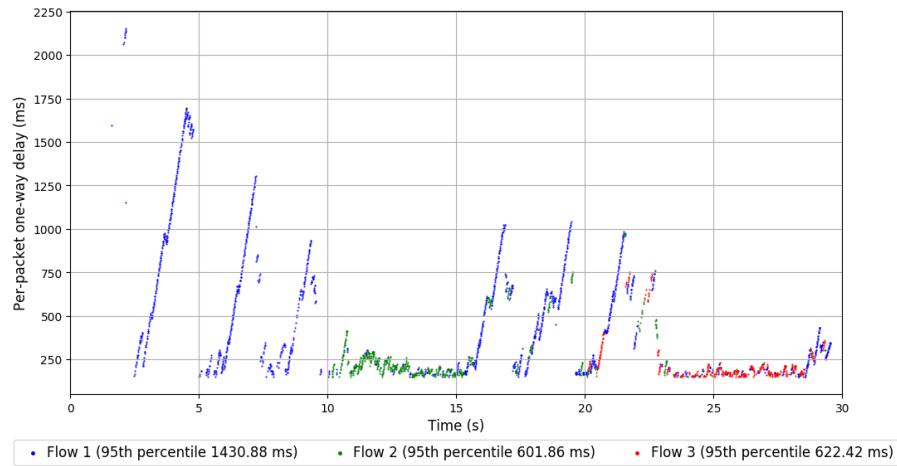
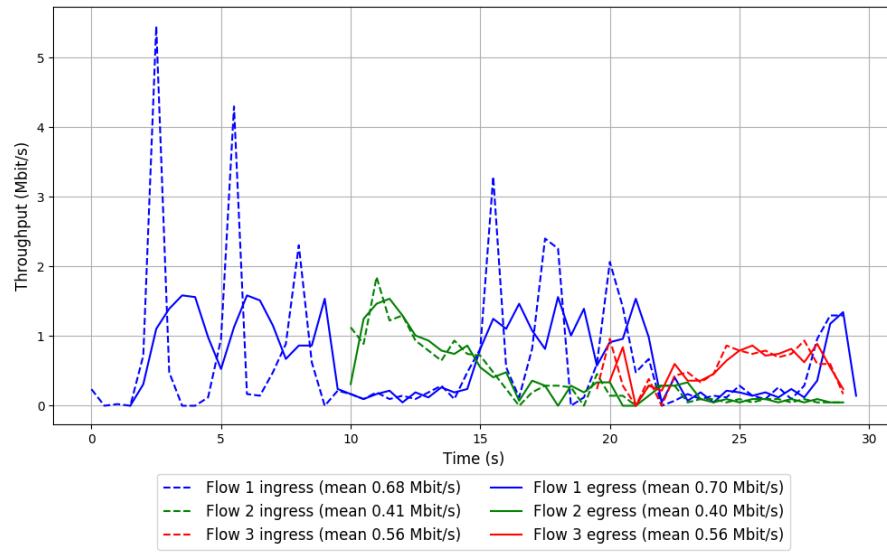


Run 2: Statistics of Indigo

```
Start at: 2017-12-20 19:19:03
End at: 2017-12-20 19:19:33
Local clock offset: -0.081 ms
Remote clock offset: 14.574 ms

# Below is generated by plot.py at 2017-12-20 19:46:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 1.16 Mbit/s
95th percentile per-packet one-way delay: 1161.961 ms
Loss rate: 1.28%
-- Flow 1:
Average throughput: 0.70 Mbit/s
95th percentile per-packet one-way delay: 1430.875 ms
Loss rate: 1.74%
-- Flow 2:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 601.862 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 622.421 ms
Loss rate: 1.37%
```

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

```
Start at: 2017-12-20 19:37:56
End at: 2017-12-20 19:38:26
Local clock offset: -0.067 ms
Remote clock offset: 17.26 ms

# Below is generated by plot.py at 2017-12-20 19:46:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.76 Mbit/s
95th percentile per-packet one-way delay: 432.572 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 652.813 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 330.910 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.89 Mbit/s
95th percentile per-packet one-way delay: 321.860 ms
Loss rate: 0.44%
```

Run 3: Report of Indigo — Data Link

