

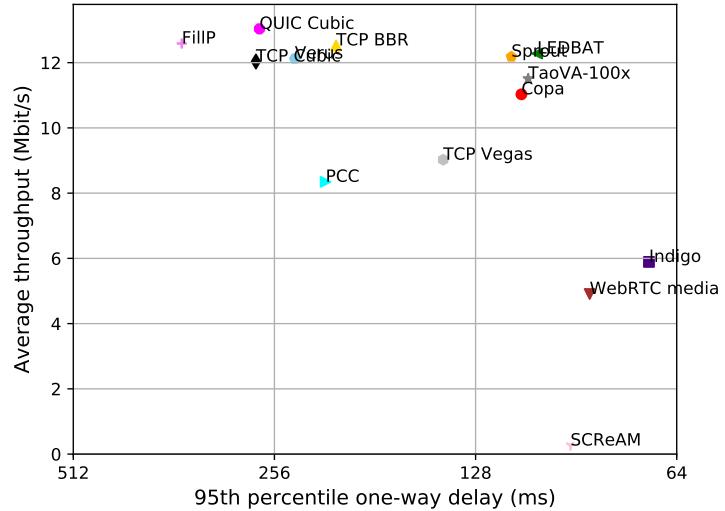
## Pantheon Report

Generated at 2018-01-10 16:36:25 (UTC).  
Data path: Stanford ppp0 (*remote*) → AWS California 1 Ethernet (*local*).  
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 `time.stanford.edu` and have been applied to correct the timestamps in logs.

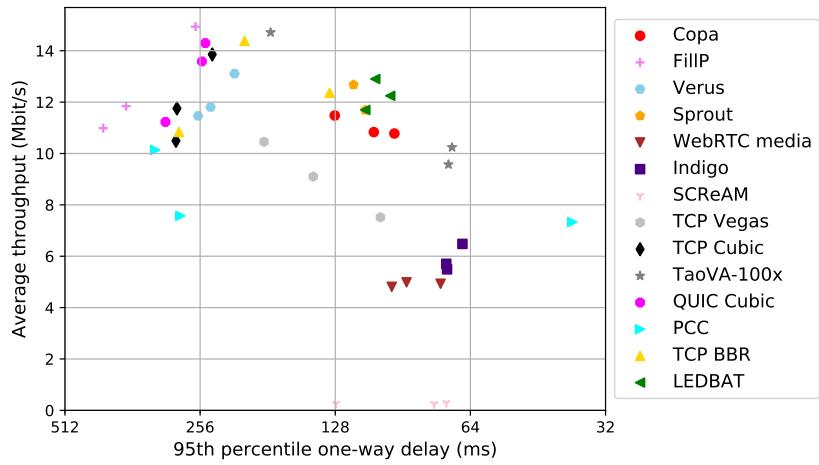
### Git summary:

```
branch: master @ 56d1792c316a5efca3f2d21342905405fedffb48
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/fillp @ ec9585325218d5048c4d4152fa42240af54c6e67
third_party/genericCC @ 80b516c448f795fd6e9675f7177b69c622f07da8
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ fb1053193c2861da659ba9013db26744ccfcf993
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



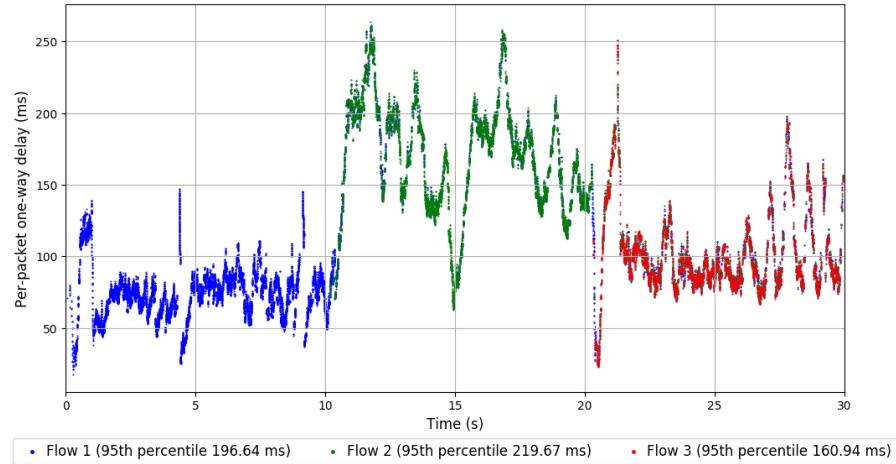
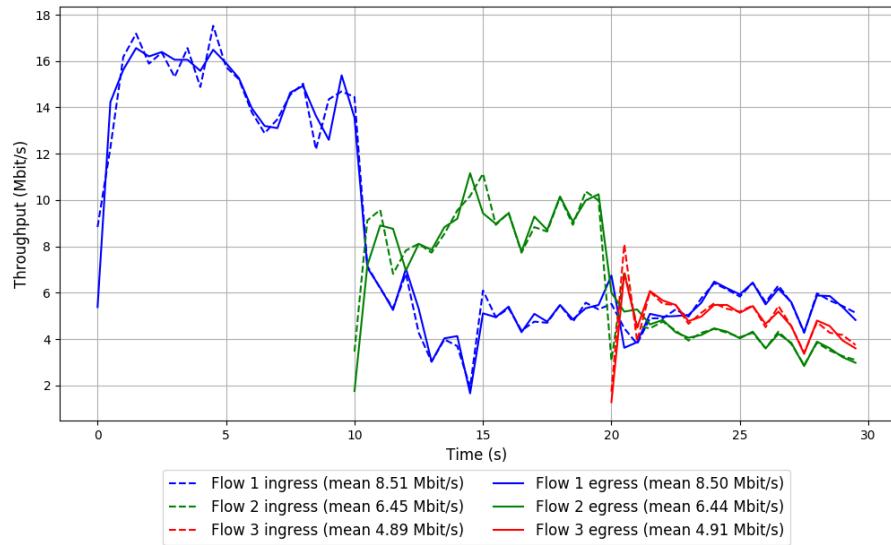
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	7.23	5.32	5.38	182.48	218.04	207.98	0.33	0.77	2.19
TCP Cubic		9.40	2.53	2.89	271.90	286.14	253.96	0.79	1.74	2.32
LEDBAT		7.21	5.60	4.13	106.67	94.85	96.35	0.46	0.83	1.45
PCC		5.39	3.43	2.04	198.94	218.24	248.03	2.90	4.07	9.98
QUIC Cubic		9.71	3.75	2.60	267.01	275.36	278.09	1.52	2.54	4.07
SCReAM		0.11	0.14	0.17	96.20	83.37	93.94	0.93	1.34	2.04
WebRTC media		2.96	1.57	0.40	86.52	84.06	85.62	1.78	1.12	3.02
Sprout		7.50	5.20	3.76	107.29	115.20	128.97	1.57	1.96	2.49
TaoVA-100x		6.61	5.22	5.50	111.37	65.07	70.96	0.43	1.17	2.66
TCP Vegas		4.90	4.78	2.89	138.85	126.00	62.25	0.10	0.21	0.31
Verus		7.31	5.53	3.49	233.41	241.28	249.37	28.60	18.75	26.23
Copa		6.92	5.22	2.71	104.29	115.89	116.22	0.15	0.29	1.12
FillP		10.64	1.31	3.41	352.96	336.61	339.48	52.20	93.80	93.32
Indigo		2.86	2.79	3.62	73.47	67.76	58.98	0.21	0.23	0.50

Run 1: Statistics of TCP BBR

```
Start at: 2018-01-10 14:50:28
End at: 2018-01-10 14:50:58
Local clock offset: -1.649 ms
Remote clock offset: -4.561 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.38 Mbit/s
95th percentile per-packet one-way delay: 203.818 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 8.50 Mbit/s
95th percentile per-packet one-way delay: 196.640 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 6.44 Mbit/s
95th percentile per-packet one-way delay: 219.669 ms
Loss rate: 0.47%
-- Flow 3:
Average throughput: 4.91 Mbit/s
95th percentile per-packet one-way delay: 160.936 ms
Loss rate: 1.19%
```

## Run 1: Report of TCP BBR — Data Link

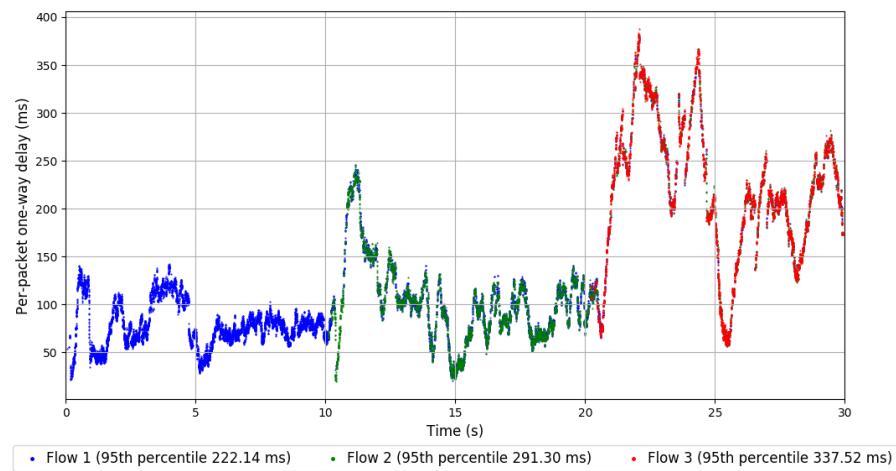
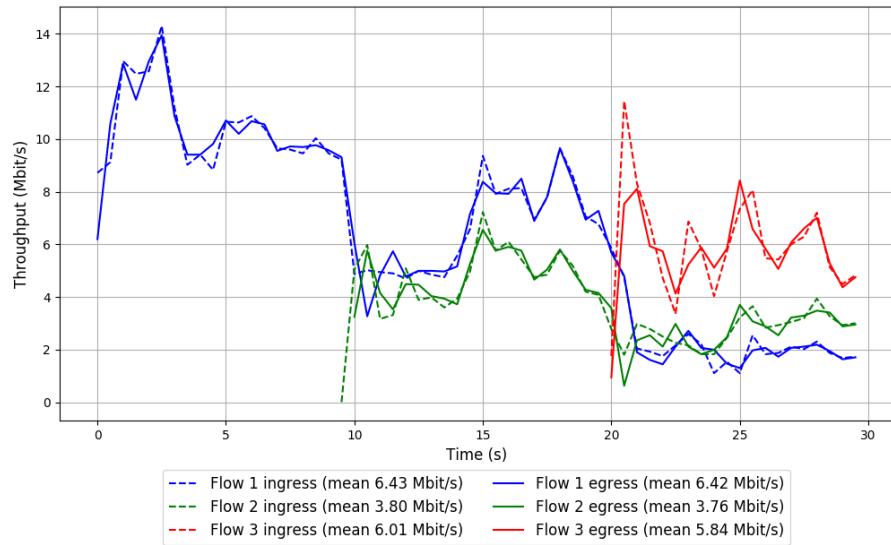


Run 2: Statistics of TCP BBR

```
Start at: 2018-01-10 15:08:20
End at: 2018-01-10 15:08:50
Local clock offset: -1.312 ms
Remote clock offset: -4.55 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.84 Mbit/s
95th percentile per-packet one-way delay: 285.392 ms
Loss rate: 1.30%
-- Flow 1:
Average throughput: 6.42 Mbit/s
95th percentile per-packet one-way delay: 222.144 ms
Loss rate: 0.43%
-- Flow 2:
Average throughput: 3.76 Mbit/s
95th percentile per-packet one-way delay: 291.297 ms
Loss rate: 1.42%
-- Flow 3:
Average throughput: 5.84 Mbit/s
95th percentile per-packet one-way delay: 337.517 ms
Loss rate: 3.95%
```

## Run 2: Report of TCP BBR — Data Link

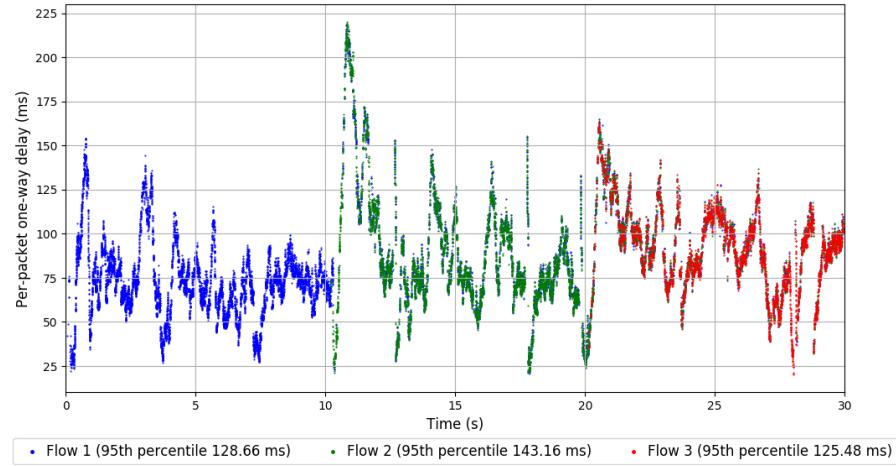
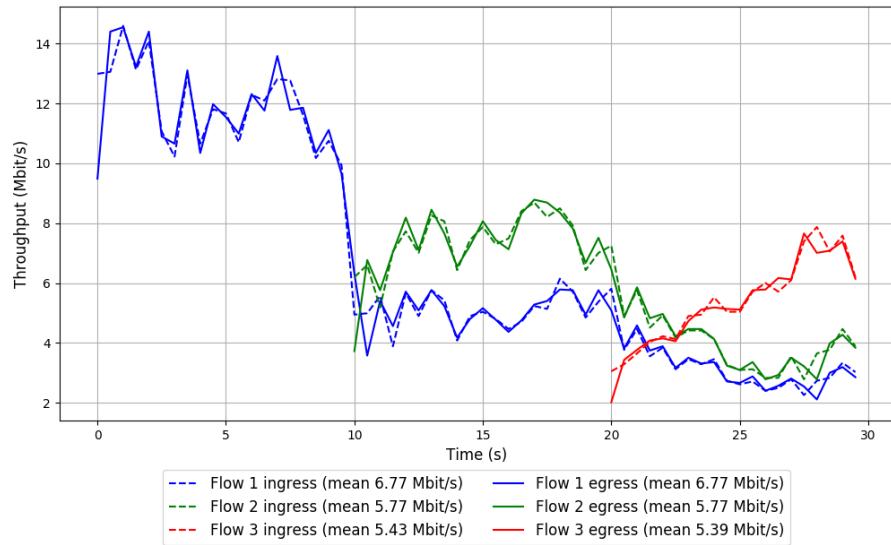


Run 3: Statistics of TCP BBR

```
Start at: 2018-01-10 15:26:12
End at: 2018-01-10 15:26:42
Local clock offset: -1.351 ms
Remote clock offset: -4.612 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.36 Mbit/s
95th percentile per-packet one-way delay: 131.716 ms
Loss rate: 0.46%
-- Flow 1:
Average throughput: 6.77 Mbit/s
95th percentile per-packet one-way delay: 128.662 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 5.77 Mbit/s
95th percentile per-packet one-way delay: 143.159 ms
Loss rate: 0.43%
-- Flow 3:
Average throughput: 5.39 Mbit/s
95th percentile per-packet one-way delay: 125.477 ms
Loss rate: 1.43%
```

### Run 3: Report of TCP BBR — Data Link

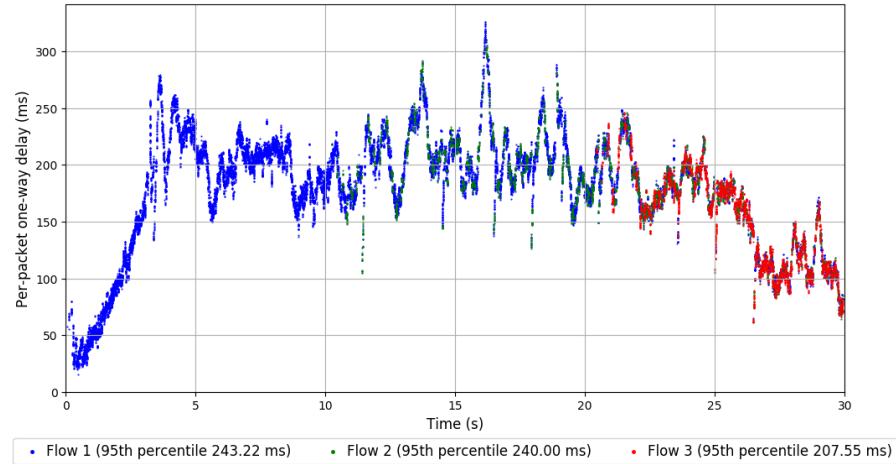
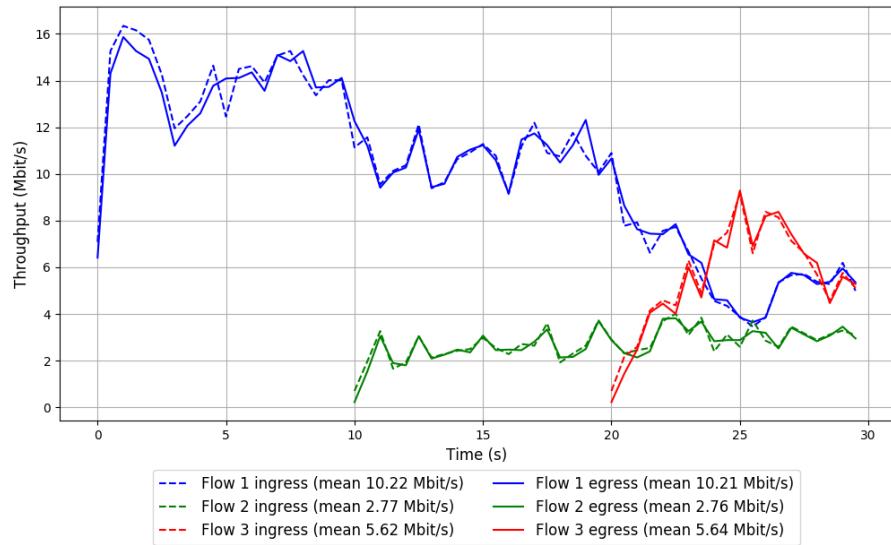


```
Run 1: Statistics of TCP Cubic
```

```
Start at: 2018-01-10 14:59:58
End at: 2018-01-10 15:00:28
Local clock offset: -1.503 ms
Remote clock offset: -4.524 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.86 Mbit/s
95th percentile per-packet one-way delay: 240.555 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 10.21 Mbit/s
95th percentile per-packet one-way delay: 243.222 ms
Loss rate: 0.40%
-- Flow 2:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 240.002 ms
Loss rate: 1.70%
-- Flow 3:
Average throughput: 5.64 Mbit/s
95th percentile per-packet one-way delay: 207.549 ms
Loss rate: 1.57%
```

## Run 1: Report of TCP Cubic — Data Link

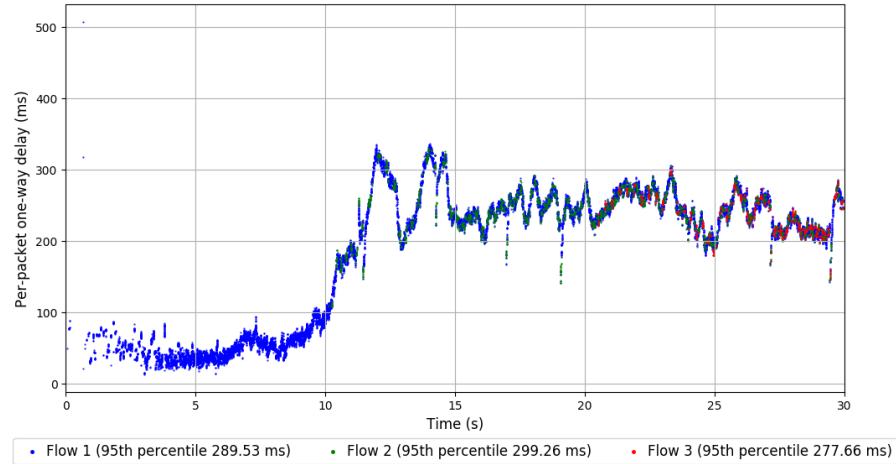
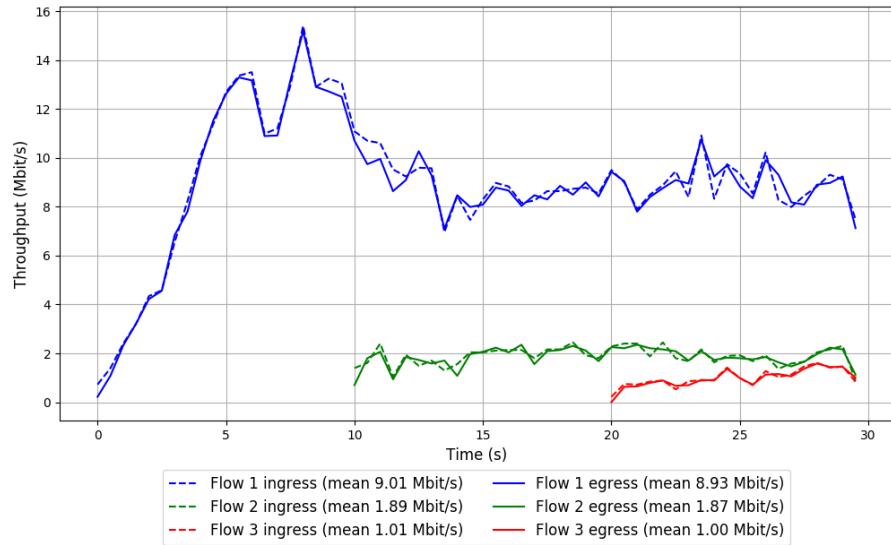


Run 2: Statistics of TCP Cubic

```
Start at: 2018-01-10 15:17:51
End at: 2018-01-10 15:18:21
Local clock offset: -1.244 ms
Remote clock offset: -4.518 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.49 Mbit/s
95th percentile per-packet one-way delay: 289.754 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 8.93 Mbit/s
95th percentile per-packet one-way delay: 289.530 ms
Loss rate: 1.11%
-- Flow 2:
Average throughput: 1.87 Mbit/s
95th percentile per-packet one-way delay: 299.261 ms
Loss rate: 1.37%
-- Flow 3:
Average throughput: 1.00 Mbit/s
95th percentile per-packet one-way delay: 277.660 ms
Loss rate: 2.77%
```

## Run 2: Report of TCP Cubic — Data Link

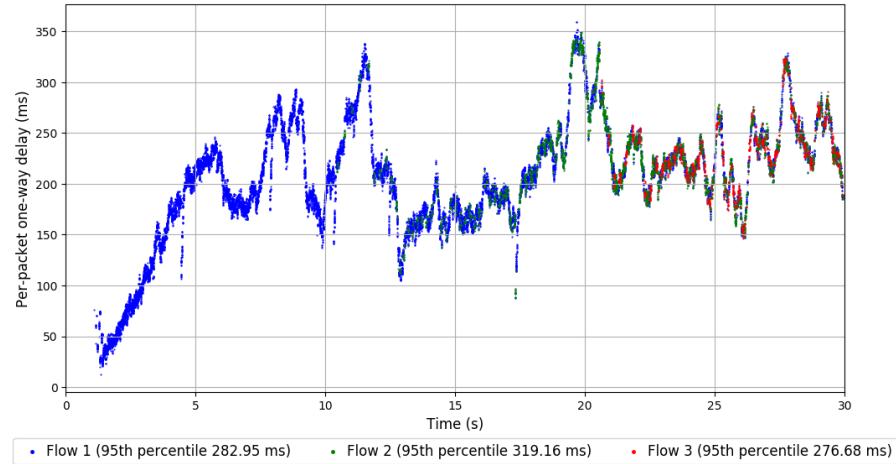
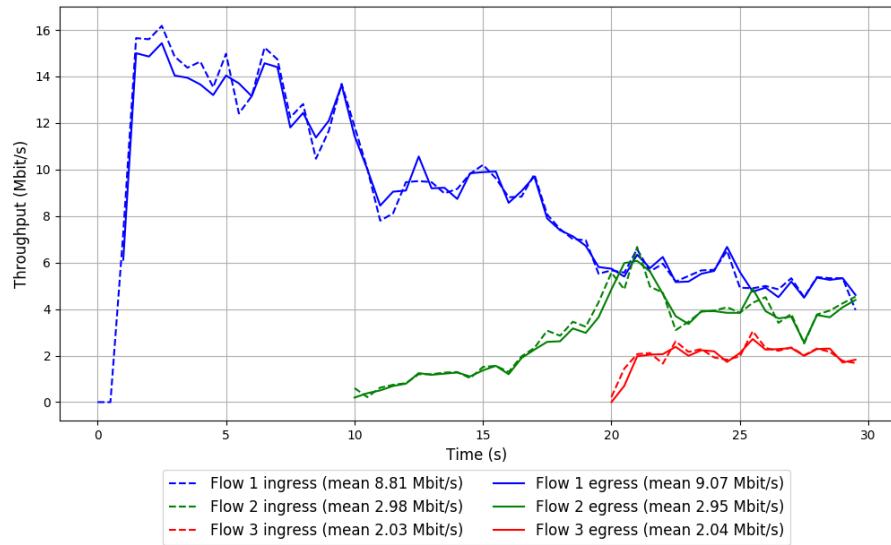


Run 3: Statistics of TCP Cubic

```
Start at: 2018-01-10 15:35:43
End at: 2018-01-10 15:36:13
Local clock offset: -1.243 ms
Remote clock offset: -4.776 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.76 Mbit/s
95th percentile per-packet one-way delay: 288.287 ms
Loss rate: 1.18%
-- Flow 1:
Average throughput: 9.07 Mbit/s
95th percentile per-packet one-way delay: 282.948 ms
Loss rate: 0.85%
-- Flow 2:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 319.160 ms
Loss rate: 2.14%
-- Flow 3:
Average throughput: 2.04 Mbit/s
95th percentile per-packet one-way delay: 276.675 ms
Loss rate: 2.63%
```

### Run 3: Report of TCP Cubic — Data Link

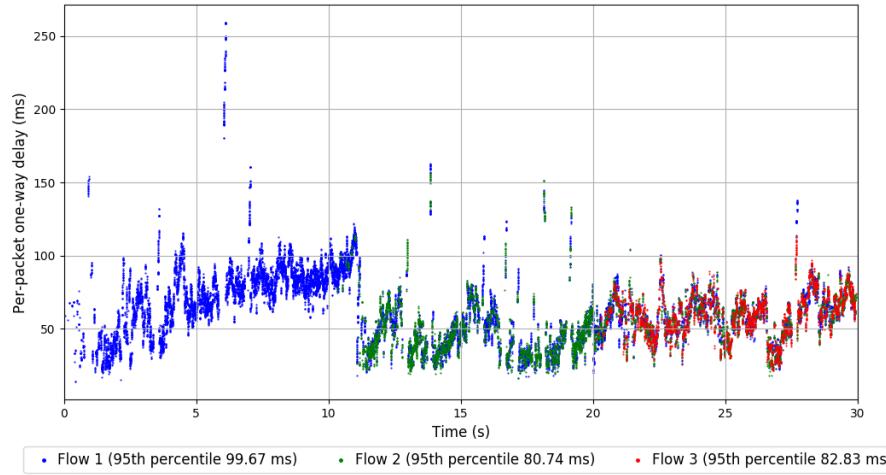
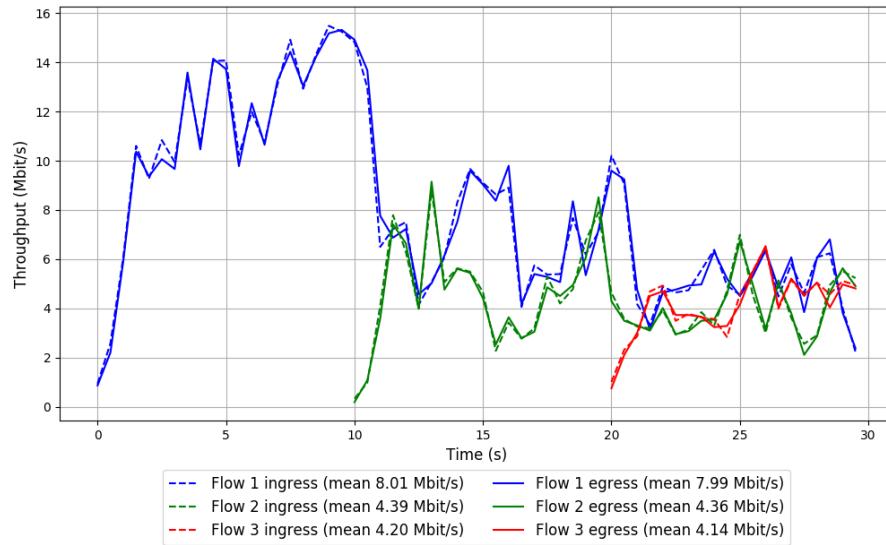


```
Run 1: Statistics of LEDBAT

Start at: 2018-01-10 14:51:39
End at: 2018-01-10 14:52:09
Local clock offset: -1.562 ms
Remote clock offset: -4.531 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.25 Mbit/s
95th percentile per-packet one-way delay: 96.564 ms
Loss rate: 0.75%
-- Flow 1:
Average throughput: 7.99 Mbit/s
95th percentile per-packet one-way delay: 99.673 ms
Loss rate: 0.44%
-- Flow 2:
Average throughput: 4.36 Mbit/s
95th percentile per-packet one-way delay: 80.742 ms
Loss rate: 1.06%
-- Flow 3:
Average throughput: 4.14 Mbit/s
95th percentile per-packet one-way delay: 82.834 ms
Loss rate: 1.86%
```

Run 1: Report of LEDBAT — Data Link

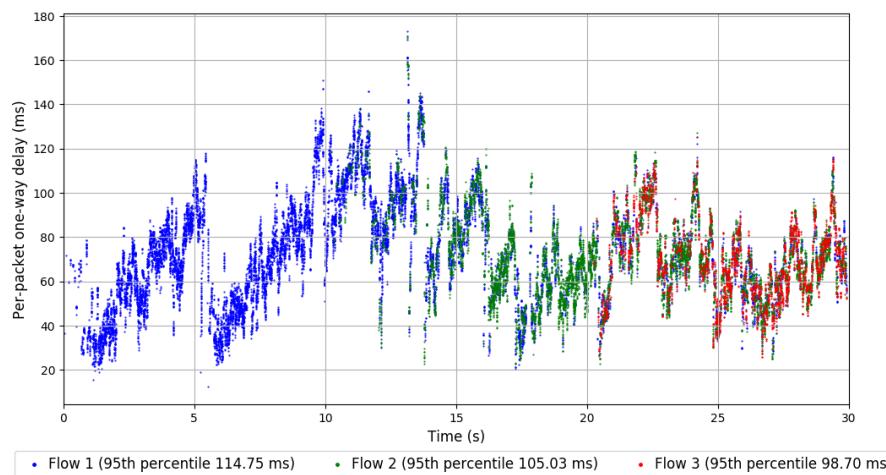
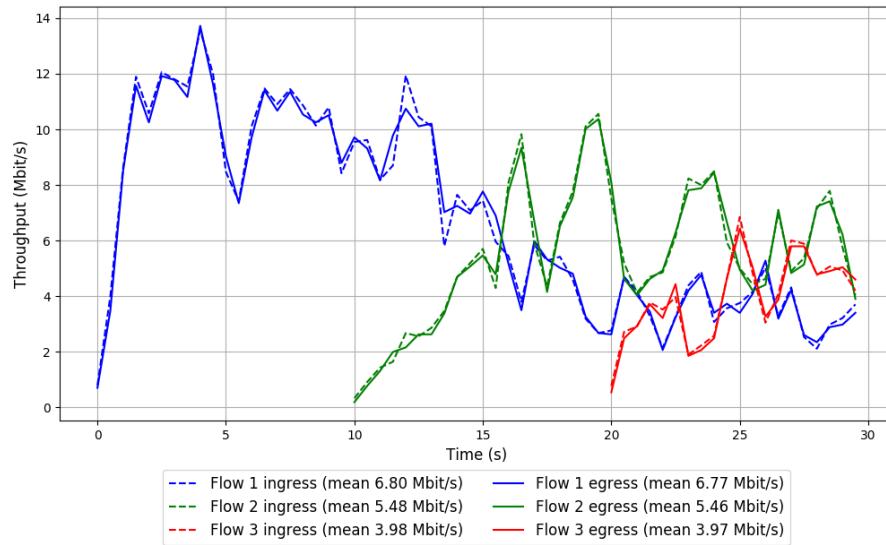


Run 2: Statistics of LEDBAT

```
Start at: 2018-01-10 15:09:32
End at: 2018-01-10 15:10:02
Local clock offset: -1.271 ms
Remote clock offset: -4.497 ms

# Below is generated by plot.py at 2018-01-10 16:34:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 109.736 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 6.77 Mbit/s
95th percentile per-packet one-way delay: 114.751 ms
Loss rate: 0.57%
-- Flow 2:
Average throughput: 5.46 Mbit/s
95th percentile per-packet one-way delay: 105.029 ms
Loss rate: 0.89%
-- Flow 3:
Average throughput: 3.97 Mbit/s
95th percentile per-packet one-way delay: 98.702 ms
Loss rate: 1.01%
```

## Run 2: Report of LEDBAT — Data Link

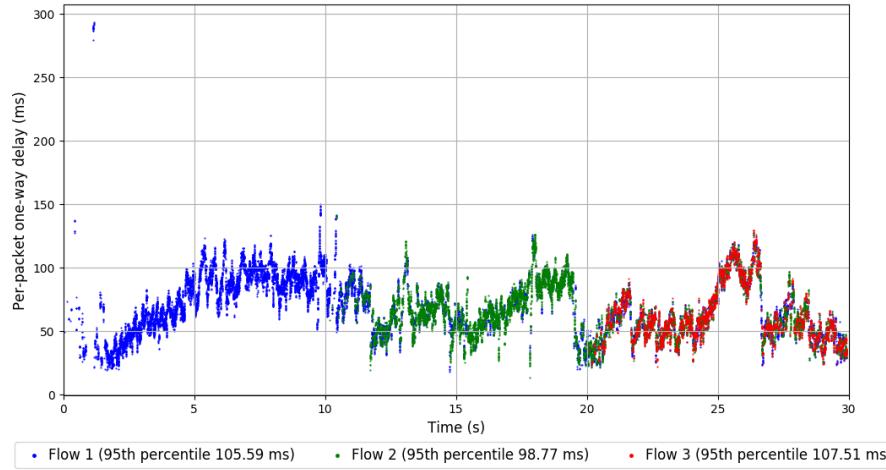
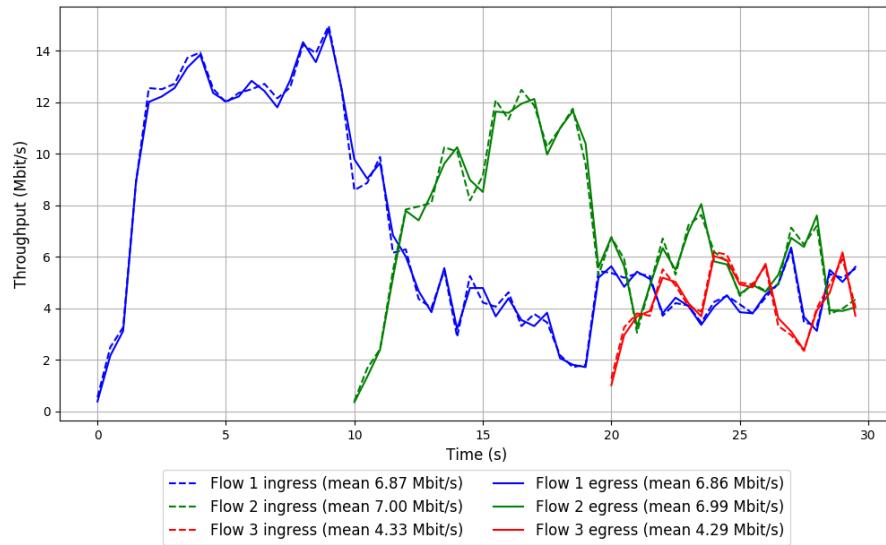


Run 3: Statistics of LEDBAT

```
Start at: 2018-01-10 15:27:24
End at: 2018-01-10 15:27:54
Local clock offset: -1.267 ms
Remote clock offset: -4.759 ms

# Below is generated by plot.py at 2018-01-10 16:34:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.90 Mbit/s
95th percentile per-packet one-way delay: 104.278 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 6.86 Mbit/s
95th percentile per-packet one-way delay: 105.587 ms
Loss rate: 0.38%
-- Flow 2:
Average throughput: 6.99 Mbit/s
95th percentile per-packet one-way delay: 98.765 ms
Loss rate: 0.54%
-- Flow 3:
Average throughput: 4.29 Mbit/s
95th percentile per-packet one-way delay: 107.514 ms
Loss rate: 1.48%
```

### Run 3: Report of LEDBAT — Data Link

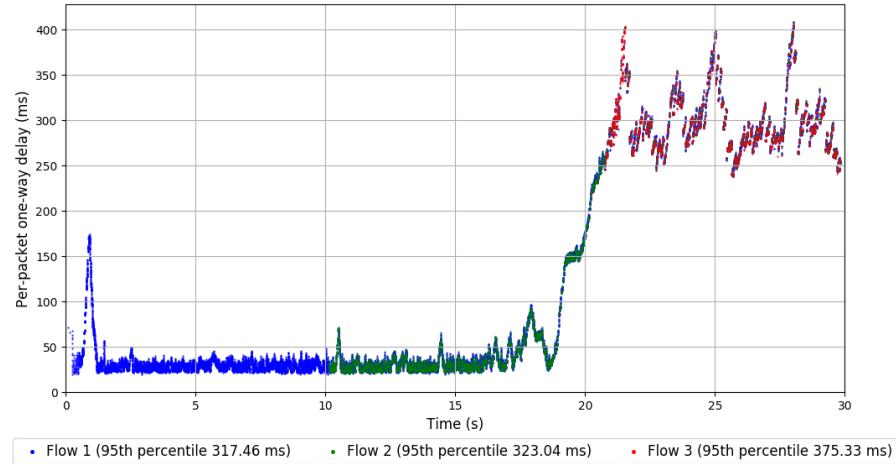
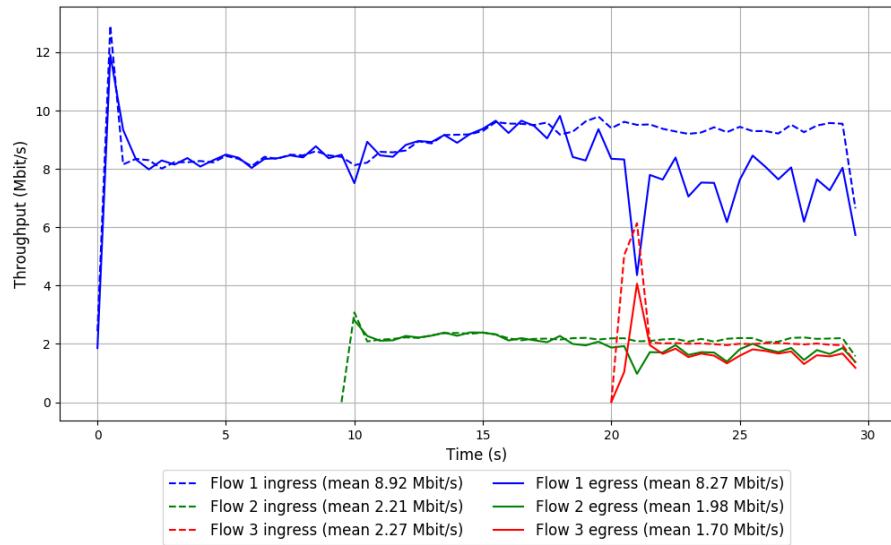


Run 1: Statistics of PCC

```
Start at: 2018-01-10 15:02:21
End at: 2018-01-10 15:02:51
Local clock offset: -1.467 ms
Remote clock offset: -4.44 ms

# Below is generated by plot.py at 2018-01-10 16:34:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.14 Mbit/s
95th percentile per-packet one-way delay: 322.341 ms
Loss rate: 9.30%
-- Flow 1:
Average throughput: 8.27 Mbit/s
95th percentile per-packet one-way delay: 317.462 ms
Loss rate: 7.63%
-- Flow 2:
Average throughput: 1.98 Mbit/s
95th percentile per-packet one-way delay: 323.042 ms
Loss rate: 10.55%
-- Flow 3:
Average throughput: 1.70 Mbit/s
95th percentile per-packet one-way delay: 375.333 ms
Loss rate: 26.85%
```

## Run 1: Report of PCC — Data Link

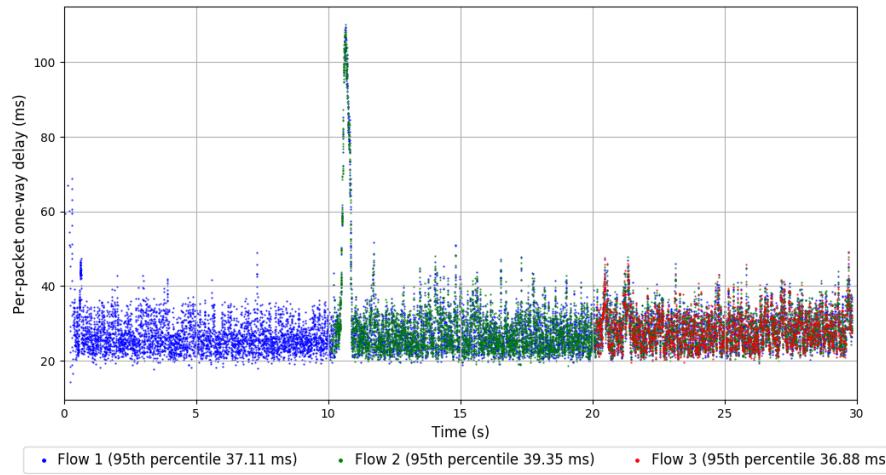
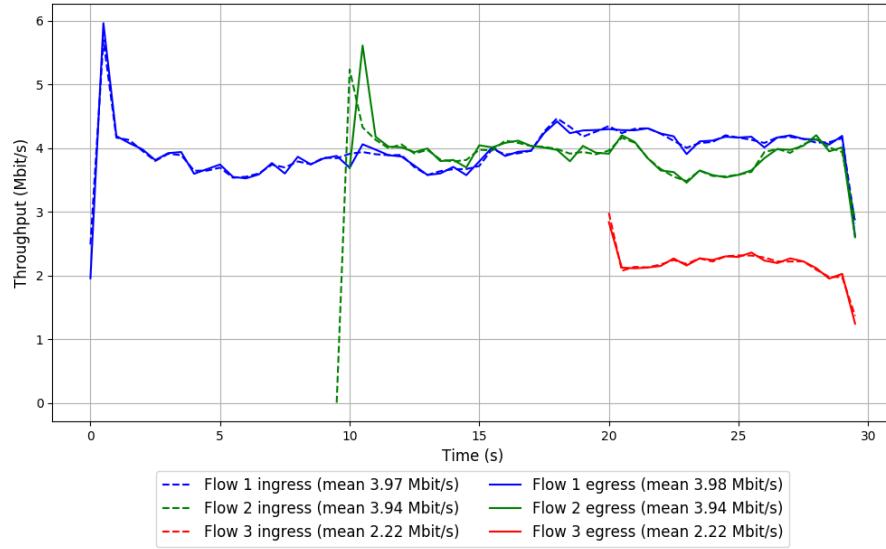


Run 2: Statistics of PCC

```
Start at: 2018-01-10 15:20:14
End at: 2018-01-10 15:20:44
Local clock offset: -1.355 ms
Remote clock offset: -4.507 ms

# Below is generated by plot.py at 2018-01-10 16:34:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.33 Mbit/s
95th percentile per-packet one-way delay: 37.949 ms
Loss rate: 0.24%
-- Flow 1:
Average throughput: 3.98 Mbit/s
95th percentile per-packet one-way delay: 37.108 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 3.94 Mbit/s
95th percentile per-packet one-way delay: 39.352 ms
Loss rate: 0.28%
-- Flow 3:
Average throughput: 2.22 Mbit/s
95th percentile per-packet one-way delay: 36.882 ms
Loss rate: 0.45%
```

## Run 2: Report of PCC — Data Link

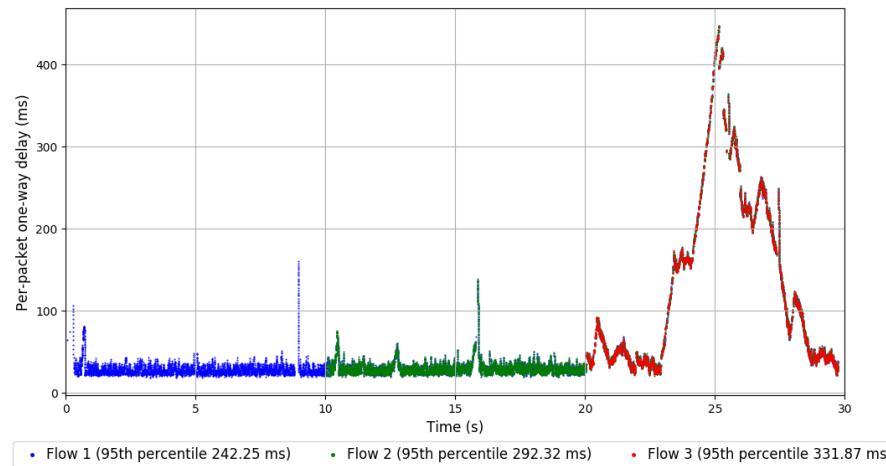
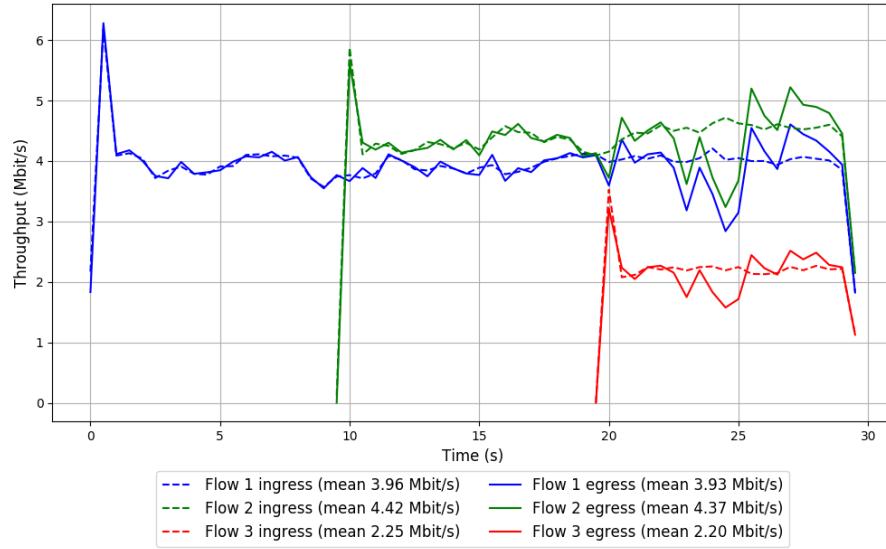


Run 3: Statistics of PCC

```
Start at: 2018-01-10 15:38:05
End at: 2018-01-10 15:38:35
Local clock offset: -1.29 ms
Remote clock offset: -4.686 ms

# Below is generated by plot.py at 2018-01-10 16:34:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.57 Mbit/s
95th percentile per-packet one-way delay: 283.409 ms
Loss rate: 1.25%
-- Flow 1:
Average throughput: 3.93 Mbit/s
95th percentile per-packet one-way delay: 242.249 ms
Loss rate: 0.89%
-- Flow 2:
Average throughput: 4.37 Mbit/s
95th percentile per-packet one-way delay: 292.317 ms
Loss rate: 1.38%
-- Flow 3:
Average throughput: 2.20 Mbit/s
95th percentile per-packet one-way delay: 331.873 ms
Loss rate: 2.64%
```

### Run 3: Report of PCC — Data Link

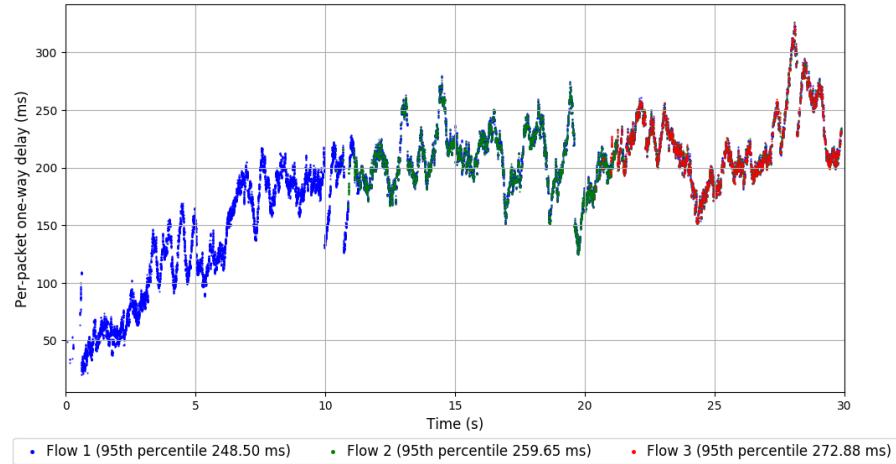
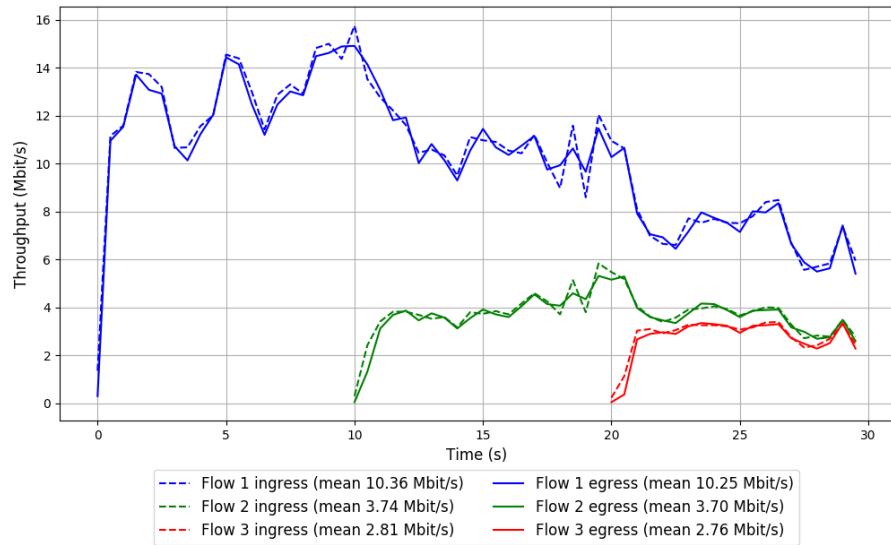


```
Run 1: Statistics of QUIC Cubic
```

```
Start at: 2018-01-10 14:57:36
End at: 2018-01-10 14:58:06
Local clock offset: -1.424 ms
Remote clock offset: -4.534 ms

# Below is generated by plot.py at 2018-01-10 16:35:02
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.58 Mbit/s
95th percentile per-packet one-way delay: 253.679 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 10.25 Mbit/s
95th percentile per-packet one-way delay: 248.498 ms
Loss rate: 1.28%
-- Flow 2:
Average throughput: 3.70 Mbit/s
95th percentile per-packet one-way delay: 259.650 ms
Loss rate: 2.23%
-- Flow 3:
Average throughput: 2.76 Mbit/s
95th percentile per-packet one-way delay: 272.882 ms
Loss rate: 3.88%
```

## Run 1: Report of QUIC Cubic — Data Link

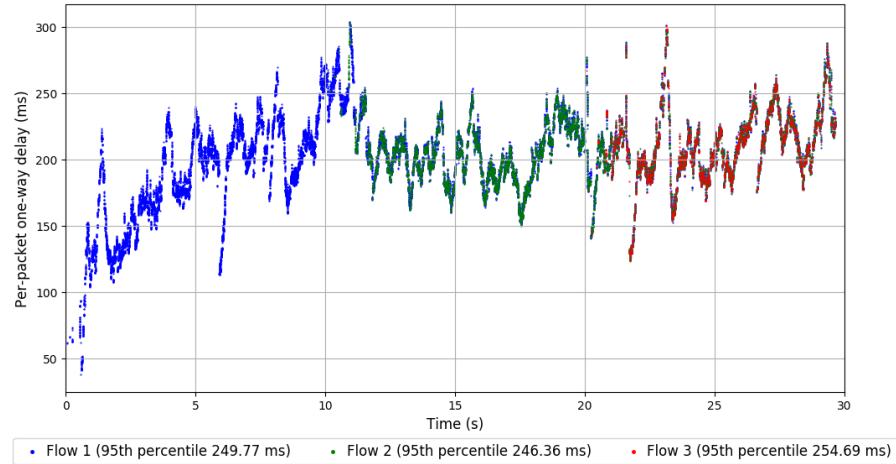
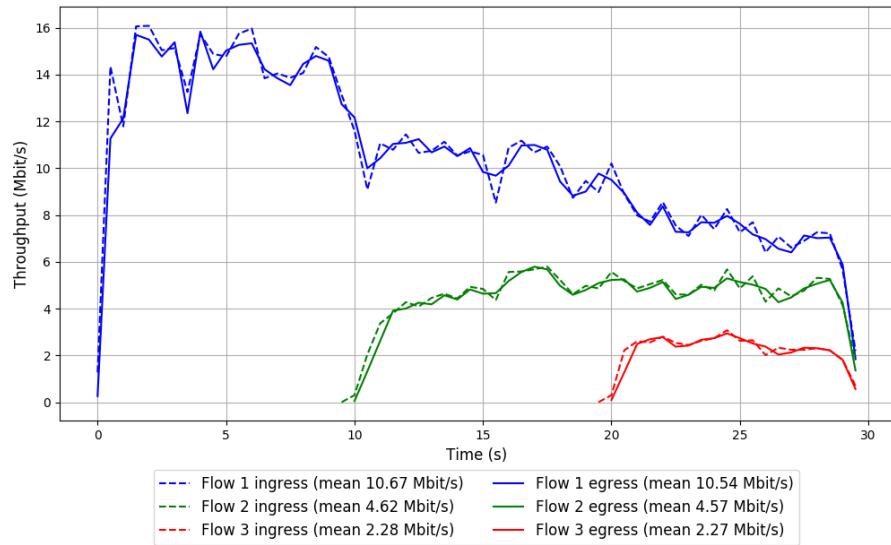


Run 2: Statistics of QUIC Cubic

```
Start at: 2018-01-10 15:15:28
End at: 2018-01-10 15:15:58
Local clock offset: -1.248 ms
Remote clock offset: -4.743 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.30 Mbit/s
95th percentile per-packet one-way delay: 249.241 ms
Loss rate: 1.78%
-- Flow 1:
Average throughput: 10.54 Mbit/s
95th percentile per-packet one-way delay: 249.769 ms
Loss rate: 1.44%
-- Flow 2:
Average throughput: 4.57 Mbit/s
95th percentile per-packet one-way delay: 246.364 ms
Loss rate: 2.55%
-- Flow 3:
Average throughput: 2.27 Mbit/s
95th percentile per-packet one-way delay: 254.686 ms
Loss rate: 3.42%
```

## Run 2: Report of QUIC Cubic — Data Link

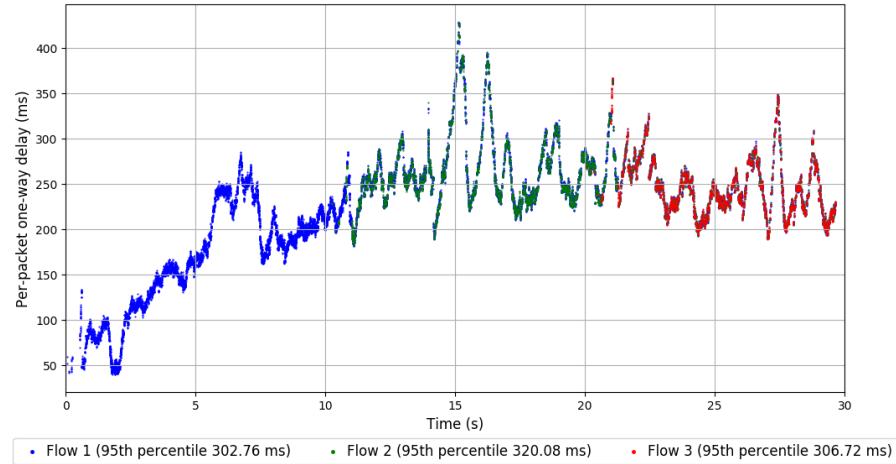
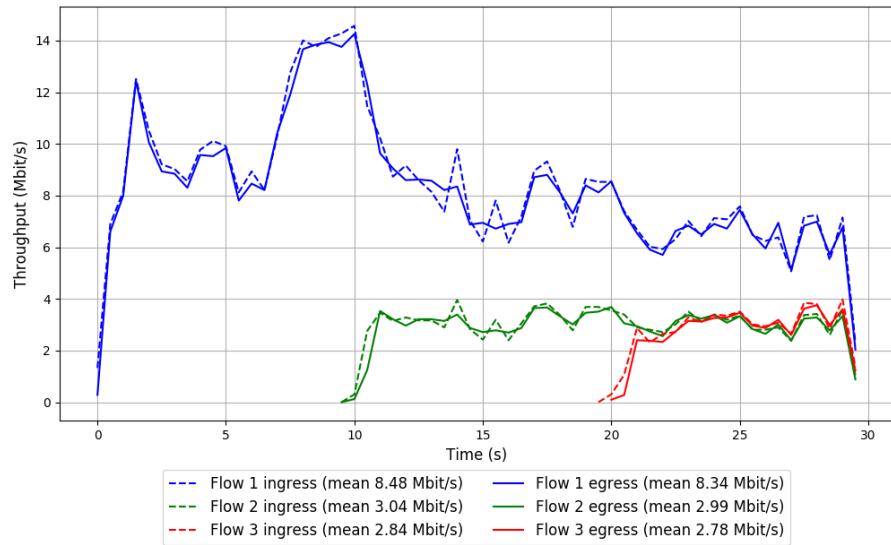


Run 3: Statistics of QUIC Cubic

```
Start at: 2018-01-10 15:33:20
End at: 2018-01-10 15:33:50
Local clock offset: -1.329 ms
Remote clock offset: -4.893 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.23 Mbit/s
95th percentile per-packet one-way delay: 305.775 ms
Loss rate: 2.26%
-- Flow 1:
Average throughput: 8.34 Mbit/s
95th percentile per-packet one-way delay: 302.758 ms
Loss rate: 1.83%
-- Flow 2:
Average throughput: 2.99 Mbit/s
95th percentile per-packet one-way delay: 320.076 ms
Loss rate: 2.83%
-- Flow 3:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 306.717 ms
Loss rate: 4.92%
```

Run 3: Report of QUIC Cubic — Data Link

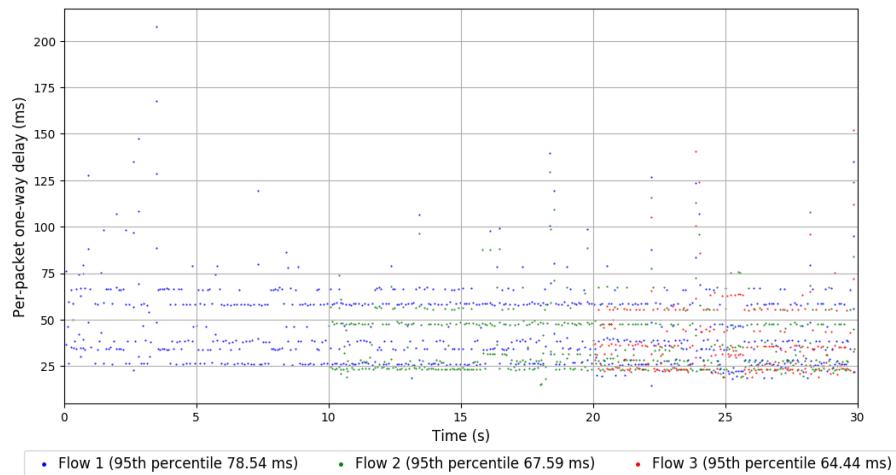
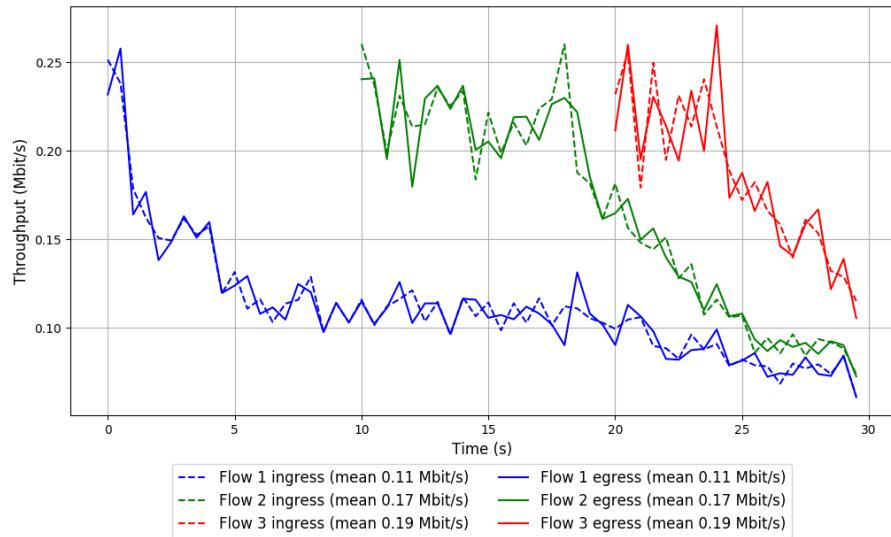


```
Run 1: Statistics of SCReAM
```

```
Start at: 2018-01-10 14:52:51
End at: 2018-01-10 14:53:21
Local clock offset: -1.599 ms
Remote clock offset: -4.471 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 72.418 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 78.536 ms
Loss rate: 0.09%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 67.589 ms
Loss rate: 0.11%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 64.444 ms
Loss rate: 0.26%
```

Run 1: Report of SCReAM — Data Link

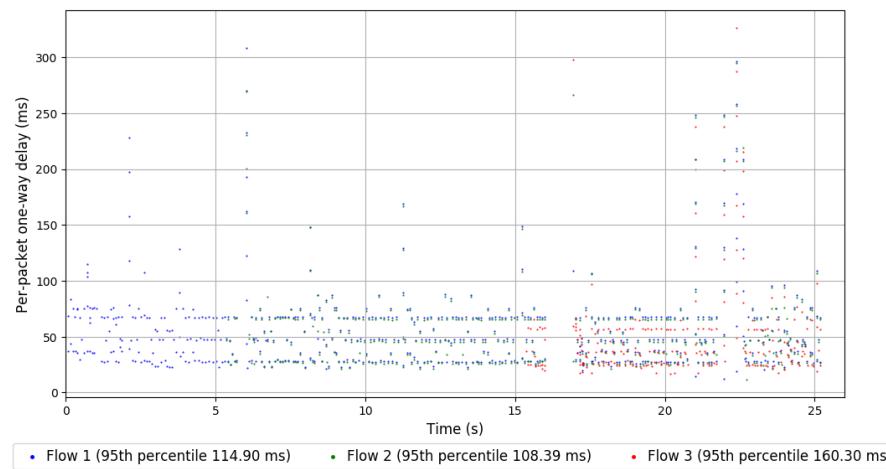
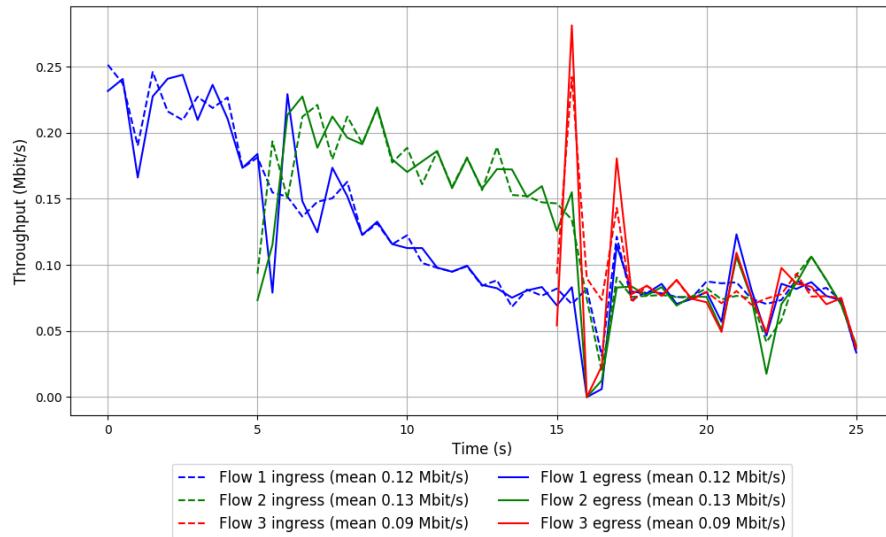


Run 2: Statistics of SCReAM

```
Start at: 2018-01-10 15:10:43
End at: 2018-01-10 15:11:13
Local clock offset: -1.272 ms
Remote clock offset: -4.643 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 127.470 ms
Loss rate: 2.57%
-- Flow 1:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 114.903 ms
Loss rate: 1.93%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 108.394 ms
Loss rate: 2.29%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 160.303 ms
Loss rate: 5.50%
```

## Run 2: Report of SCReAM — Data Link

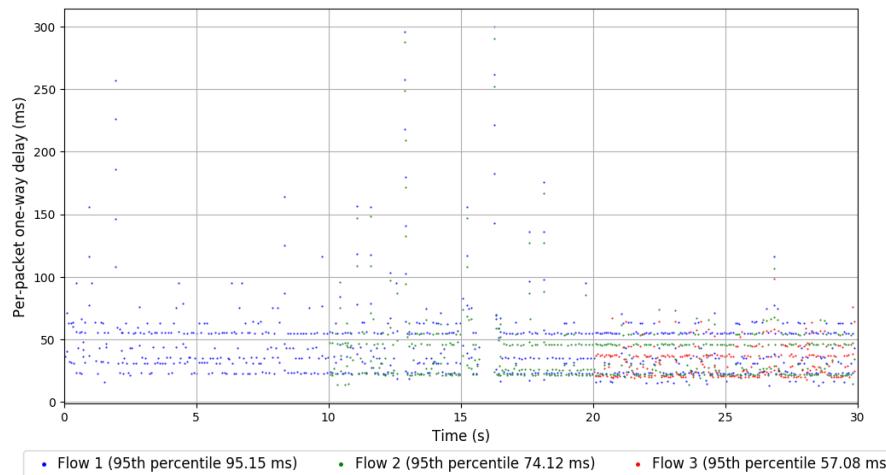
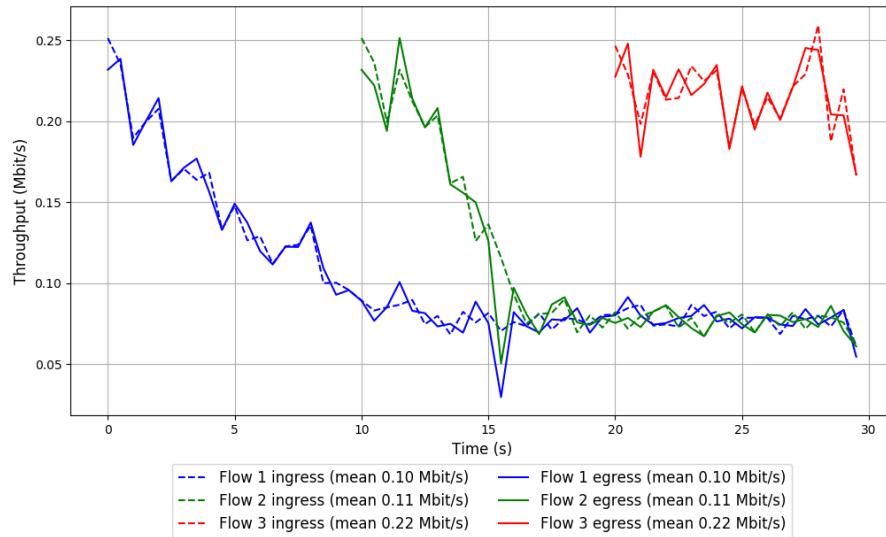


Run 3: Statistics of SCReAM

```
Start at: 2018-01-10 15:28:35
End at: 2018-01-10 15:29:05
Local clock offset: -1.352 ms
Remote clock offset: -4.683 ms

# Below is generated by plot.py at 2018-01-10 16:35:04
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 77.066 ms
Loss rate: 0.90%
-- Flow 1:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 95.149 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 74.124 ms
Loss rate: 1.63%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 57.080 ms
Loss rate: 0.36%
```

### Run 3: Report of SCReAM — Data Link

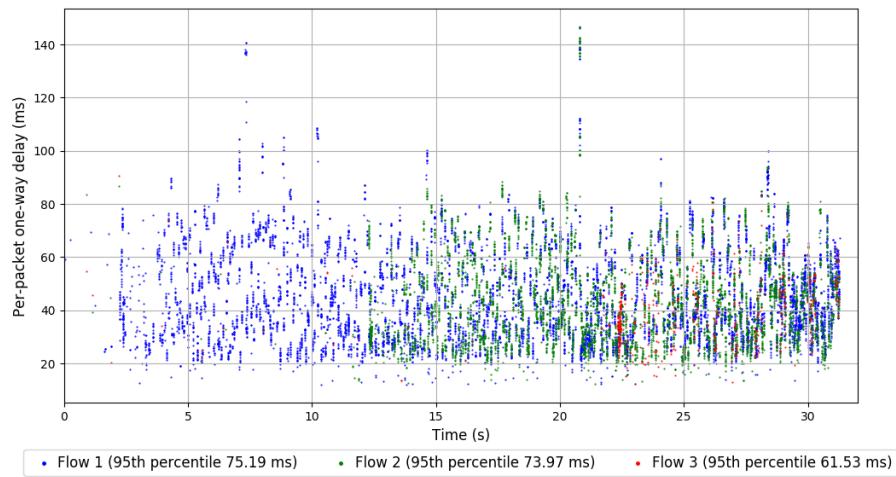
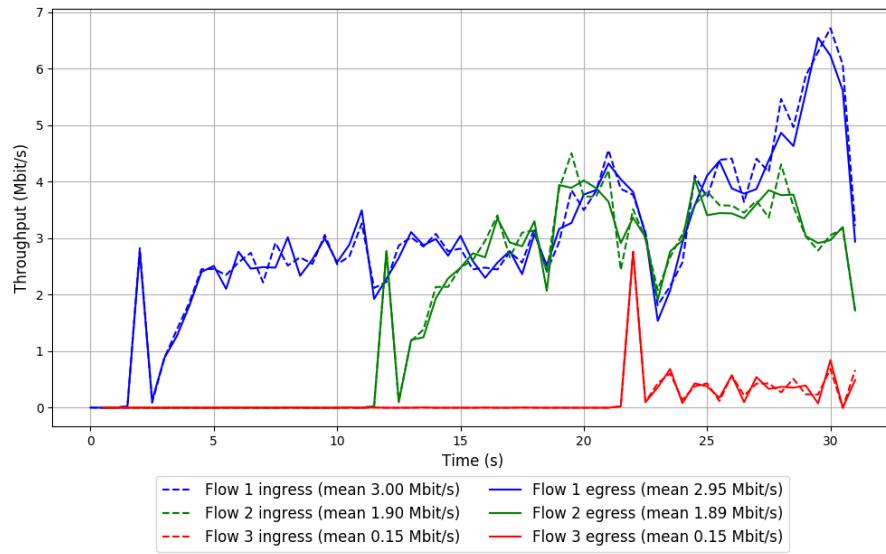


```
Run 1: Statistics of WebRTC media

Start at: 2018-01-10 14:56:25
End at: 2018-01-10 14:56:55
Local clock offset: -1.542 ms
Remote clock offset: -4.528 ms

# Below is generated by plot.py at 2018-01-10 16:35:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.93 Mbit/s
95th percentile per-packet one-way delay: 74.579 ms
Loss rate: 1.56%
-- Flow 1:
Average throughput: 2.95 Mbit/s
95th percentile per-packet one-way delay: 75.188 ms
Loss rate: 1.85%
-- Flow 2:
Average throughput: 1.89 Mbit/s
95th percentile per-packet one-way delay: 73.965 ms
Loss rate: 1.05%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 61.529 ms
Loss rate: 1.90%
```

Run 1: Report of WebRTC media — Data Link

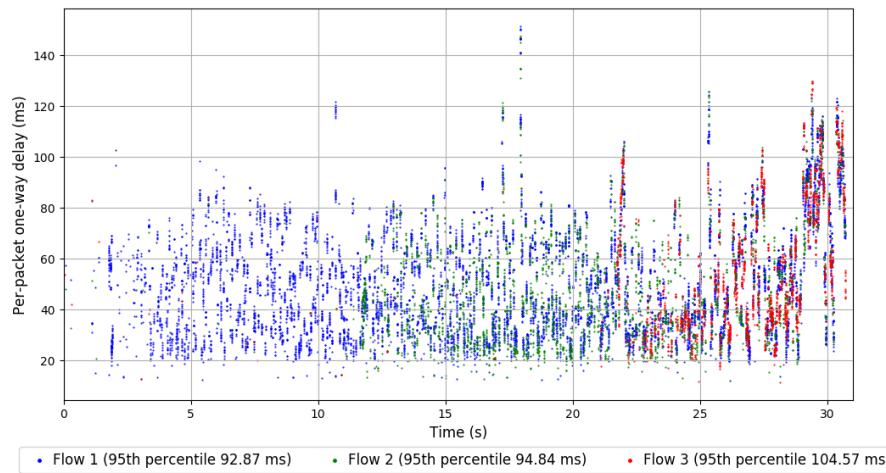
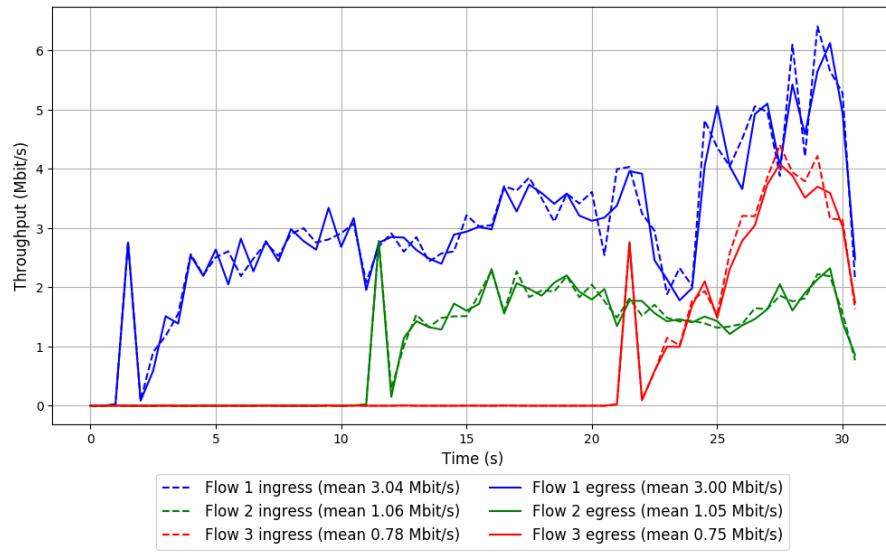


Run 2: Statistics of WebRTC media

```
Start at: 2018-01-10 15:14:17
End at: 2018-01-10 15:14:47
Local clock offset: -1.345 ms
Remote clock offset: -4.699 ms

# Below is generated by plot.py at 2018-01-10 16:35:05
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.81 Mbit/s
95th percentile per-packet one-way delay: 95.806 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 3.00 Mbit/s
95th percentile per-packet one-way delay: 92.867 ms
Loss rate: 1.48%
-- Flow 2:
Average throughput: 1.05 Mbit/s
95th percentile per-packet one-way delay: 94.845 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 0.75 Mbit/s
95th percentile per-packet one-way delay: 104.566 ms
Loss rate: 3.88%
```

Run 2: Report of WebRTC media — Data Link

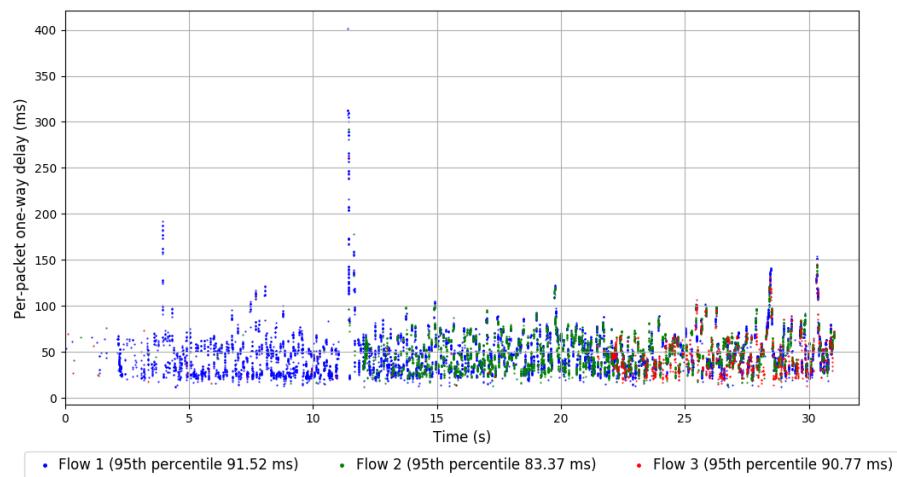
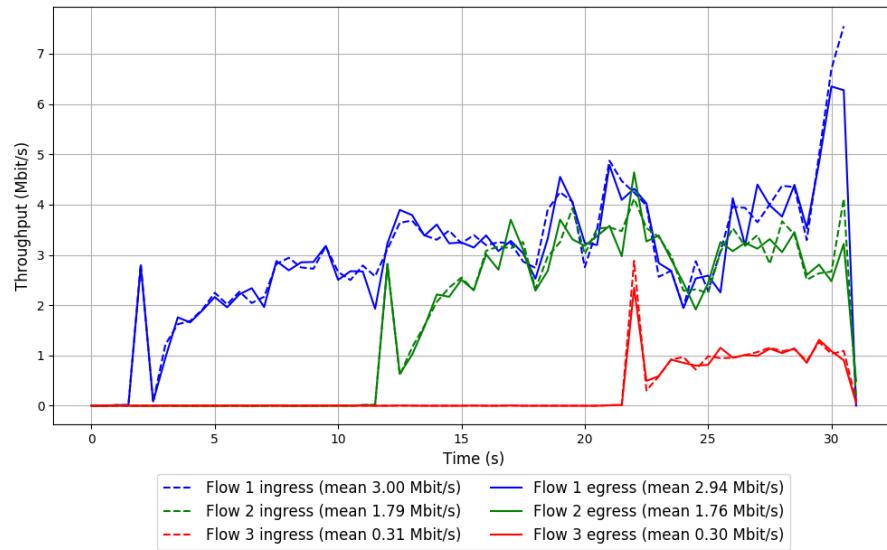


Run 3: Statistics of WebRTC media

```
Start at: 2018-01-10 15:32:09
End at: 2018-01-10 15:32:39
Local clock offset: -1.243 ms
Remote clock offset: -4.921 ms

# Below is generated by plot.py at 2018-01-10 16:35:08
# Datalink statistics
-- Total of 3 flows:
Average throughput: 4.98 Mbit/s
95th percentile per-packet one-way delay: 88.796 ms
Loss rate: 2.06%
-- Flow 1:
Average throughput: 2.94 Mbit/s
95th percentile per-packet one-way delay: 91.517 ms
Loss rate: 2.00%
-- Flow 2:
Average throughput: 1.76 Mbit/s
95th percentile per-packet one-way delay: 83.374 ms
Loss rate: 1.96%
-- Flow 3:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 90.771 ms
Loss rate: 3.29%
```

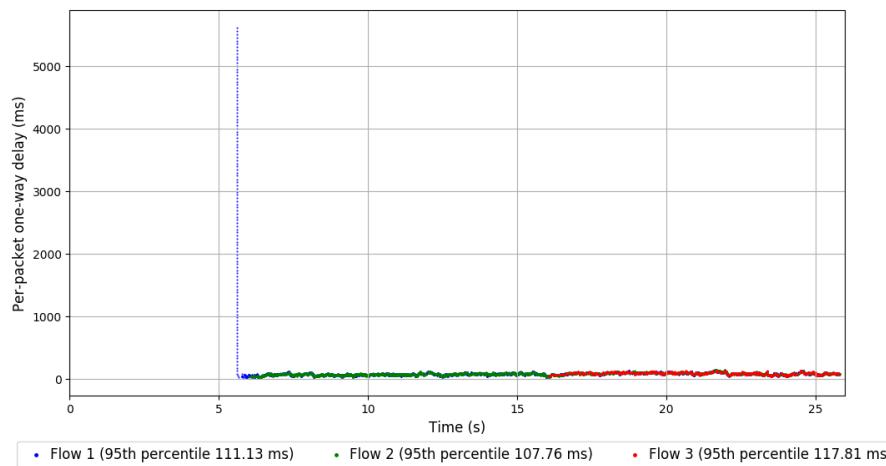
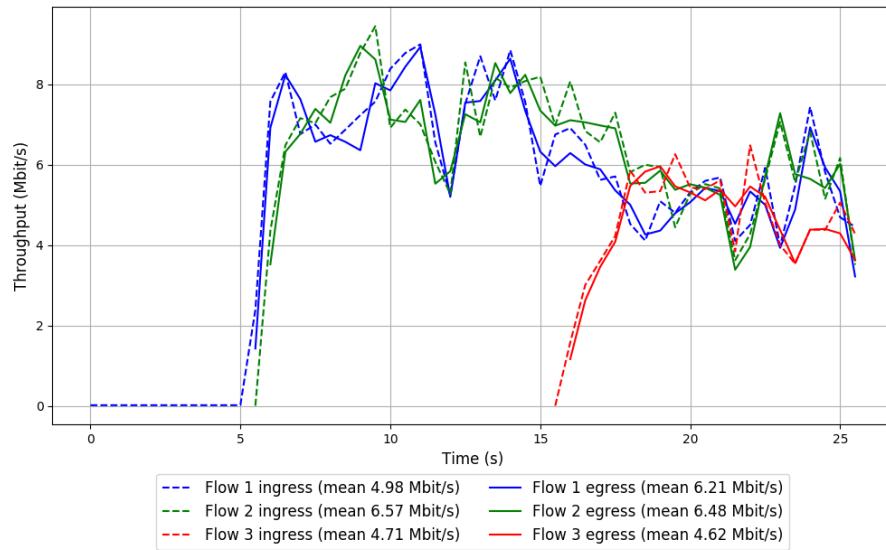
Run 3: Report of WebRTC media — Data Link



Run 1: Statistics of Sprout

Start at: 2018-01-10 14:54:02  
End at: 2018-01-10 14:54:32  
Local clock offset: -1.493 ms  
Remote clock offset: -4.481 ms

Run 1: Report of Sprout — Data Link

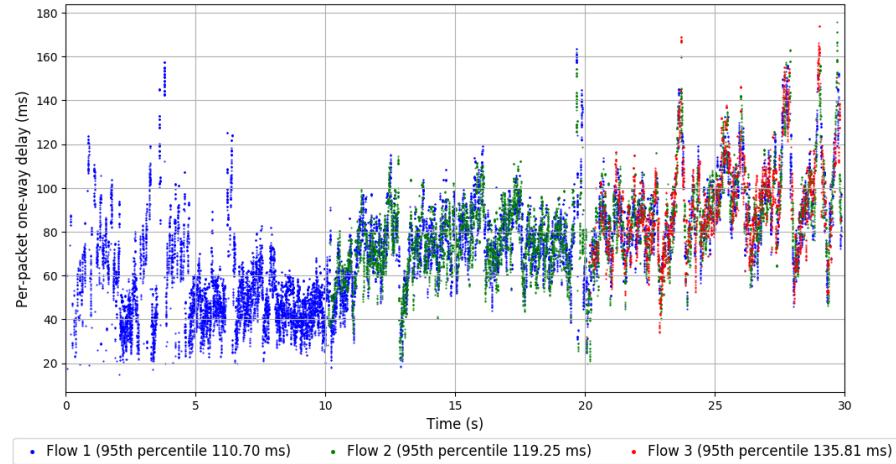
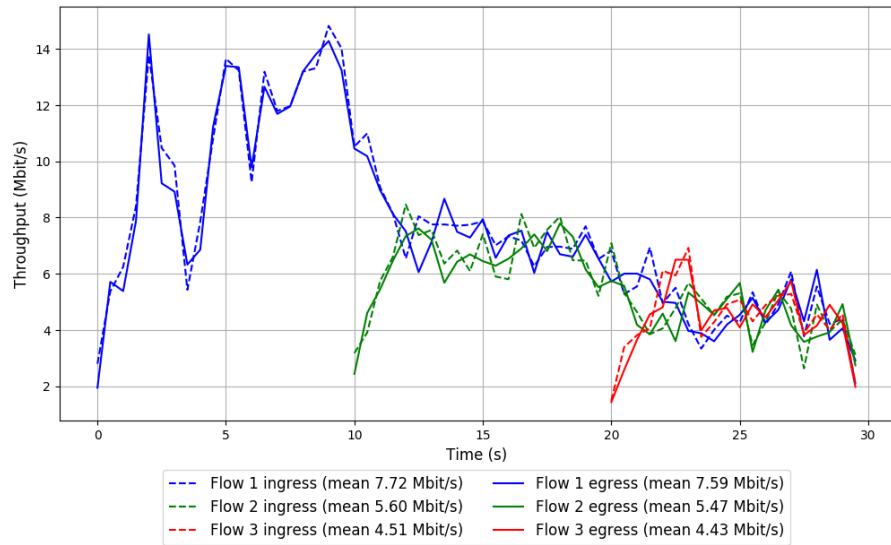


Run 2: Statistics of Sprout

```
Start at: 2018-01-10 15:11:54
End at: 2018-01-10 15:12:24
Local clock offset: -1.253 ms
Remote clock offset: -4.627 ms

# Below is generated by plot.py at 2018-01-10 16:35:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 12.68 Mbit/s
95th percentile per-packet one-way delay: 116.544 ms
Loss rate: 2.04%
-- Flow 1:
Average throughput: 7.59 Mbit/s
95th percentile per-packet one-way delay: 110.696 ms
Loss rate: 1.79%
-- Flow 2:
Average throughput: 5.47 Mbit/s
95th percentile per-packet one-way delay: 119.251 ms
Loss rate: 2.58%
-- Flow 3:
Average throughput: 4.43 Mbit/s
95th percentile per-packet one-way delay: 135.808 ms
Loss rate: 1.95%
```

## Run 2: Report of Sprout — Data Link

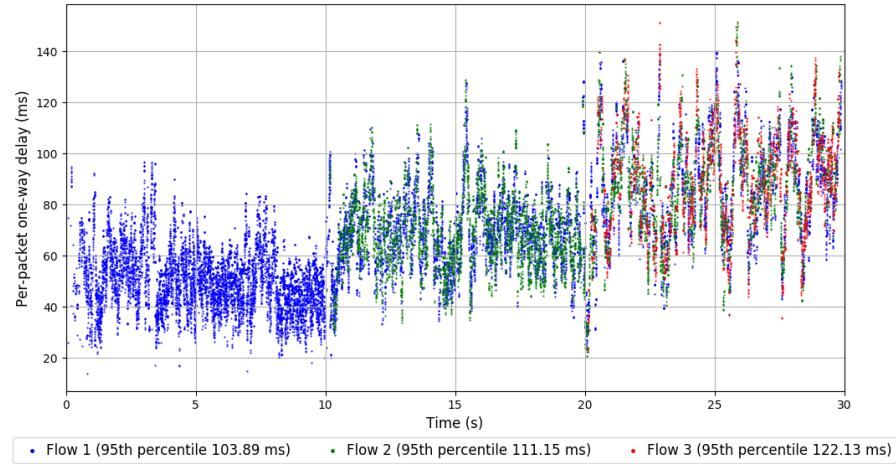
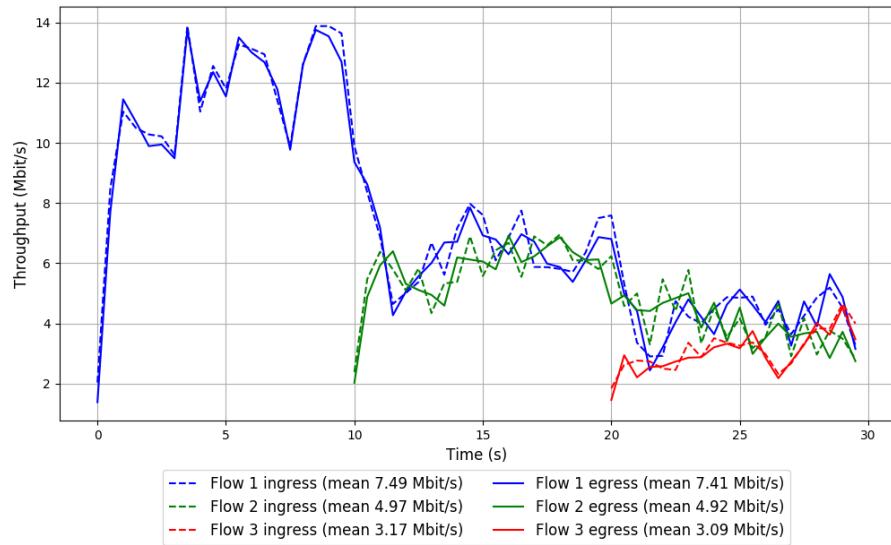


Run 3: Statistics of Sprout

```
Start at: 2018-01-10 15:29:46
End at: 2018-01-10 15:30:16
Local clock offset: -1.355 ms
Remote clock offset: -4.798 ms

# Below is generated by plot.py at 2018-01-10 16:35:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.69 Mbit/s
95th percentile per-packet one-way delay: 109.780 ms
Loss rate: 1.50%
-- Flow 1:
Average throughput: 7.41 Mbit/s
95th percentile per-packet one-way delay: 103.888 ms
Loss rate: 1.35%
-- Flow 2:
Average throughput: 4.92 Mbit/s
95th percentile per-packet one-way delay: 111.154 ms
Loss rate: 1.34%
-- Flow 3:
Average throughput: 3.09 Mbit/s
95th percentile per-packet one-way delay: 122.129 ms
Loss rate: 3.03%
```

### Run 3: Report of Sprout — Data Link

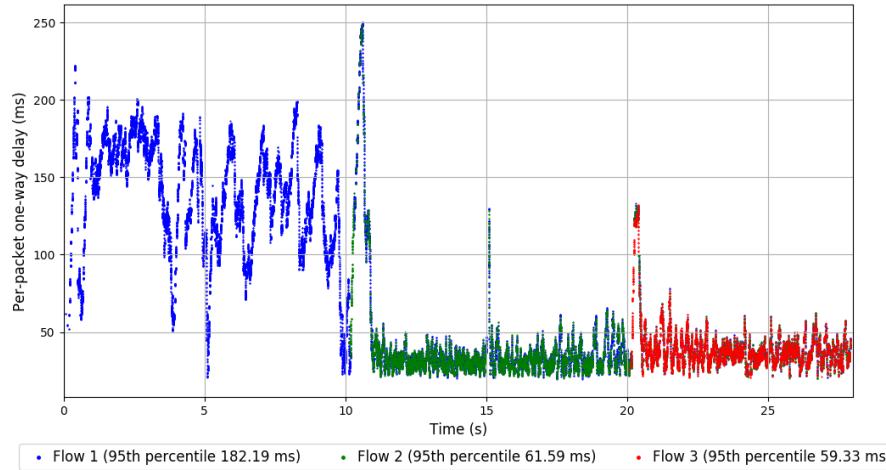
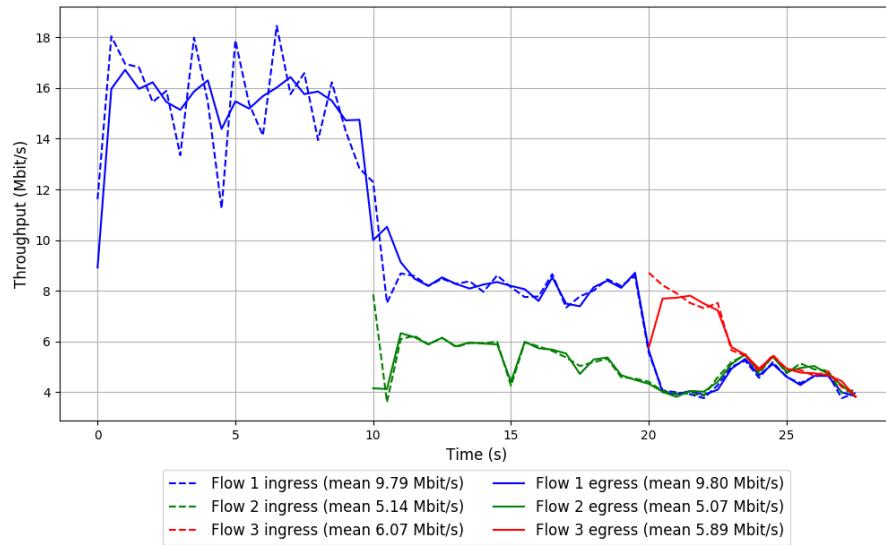


Run 1: Statistics of TaoVA-100x

```
Start at: 2018-01-10 14:48:04
End at: 2018-01-10 14:48:34
Local clock offset: -1.675 ms
Remote clock offset: -4.619 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.71 Mbit/s
95th percentile per-packet one-way delay: 178.363 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 9.80 Mbit/s
95th percentile per-packet one-way delay: 182.188 ms
Loss rate: 0.21%
-- Flow 2:
Average throughput: 5.07 Mbit/s
95th percentile per-packet one-way delay: 61.590 ms
Loss rate: 1.71%
-- Flow 3:
Average throughput: 5.89 Mbit/s
95th percentile per-packet one-way delay: 59.332 ms
Loss rate: 3.44%
```

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

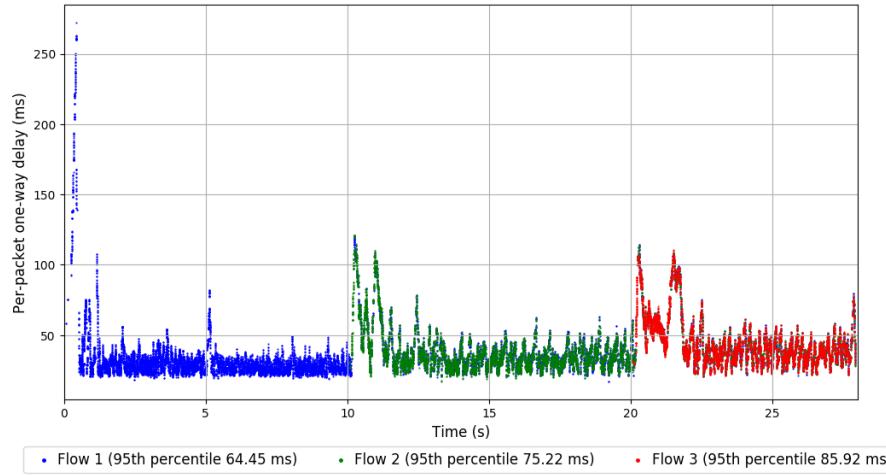
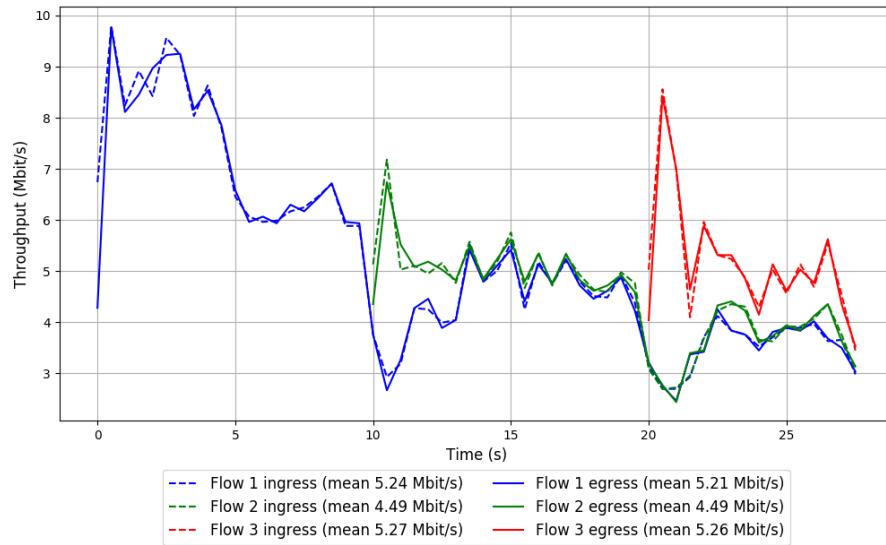


Run 2: Statistics of TaoVA-100x

```
Start at: 2018-01-10 15:05:57
End at: 2018-01-10 15:06:27
Local clock offset: -1.415 ms
Remote clock offset: -4.476 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.57 Mbit/s
95th percentile per-packet one-way delay: 71.639 ms
Loss rate: 0.72%
-- Flow 1:
Average throughput: 5.21 Mbit/s
95th percentile per-packet one-way delay: 64.452 ms
Loss rate: 0.90%
-- Flow 2:
Average throughput: 4.49 Mbit/s
95th percentile per-packet one-way delay: 75.223 ms
Loss rate: 0.39%
-- Flow 3:
Average throughput: 5.26 Mbit/s
95th percentile per-packet one-way delay: 85.921 ms
Loss rate: 0.75%
```

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

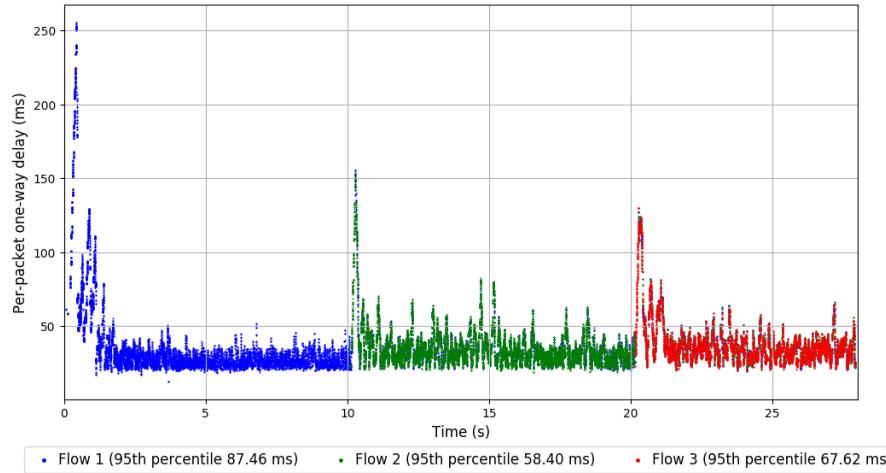
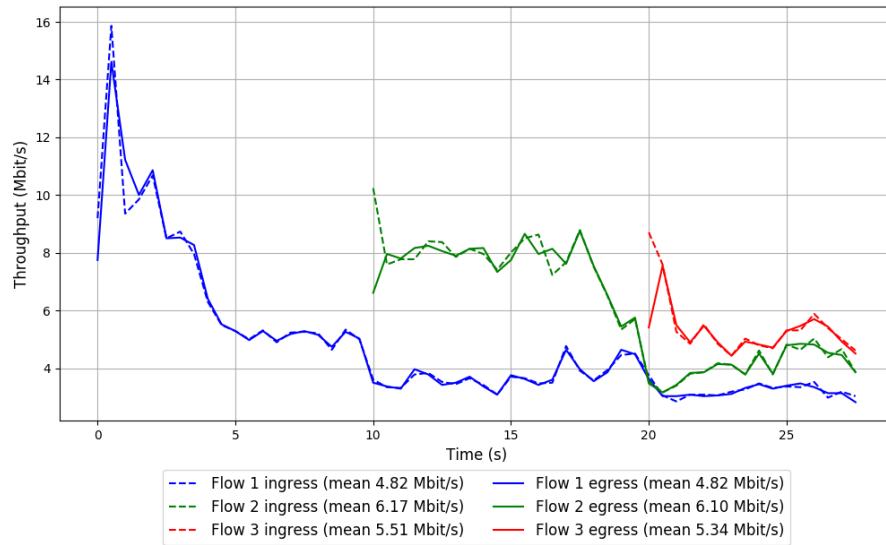


Run 3: Statistics of TaoVA-100x

```
Start at: 2018-01-10 15:23:49
End at: 2018-01-10 15:24:19
Local clock offset: -1.25 ms
Remote clock offset: -4.65 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.24 Mbit/s
95th percentile per-packet one-way delay: 70.320 ms
Loss rate: 1.19%
-- Flow 1:
Average throughput: 4.82 Mbit/s
95th percentile per-packet one-way delay: 87.460 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 6.10 Mbit/s
95th percentile per-packet one-way delay: 58.399 ms
Loss rate: 1.40%
-- Flow 3:
Average throughput: 5.34 Mbit/s
95th percentile per-packet one-way delay: 67.625 ms
Loss rate: 3.78%
```

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

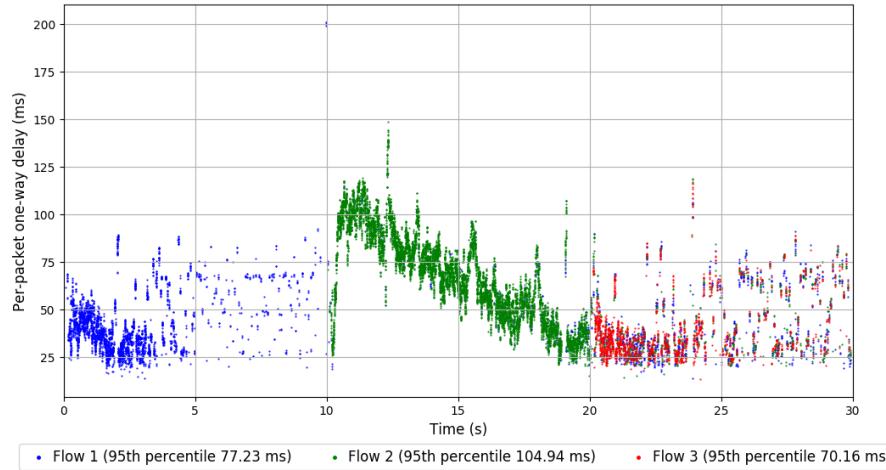
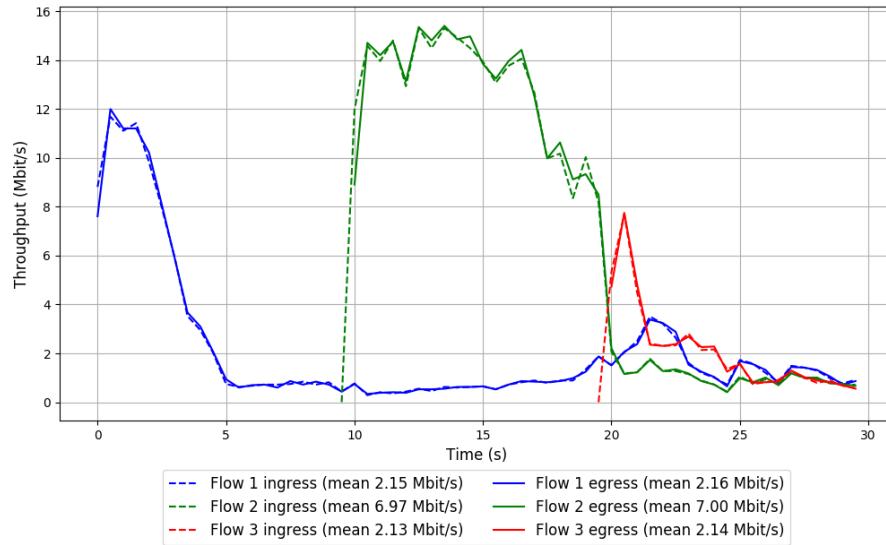


Run 1: Statistics of TCP Vegas

```
Start at: 2018-01-10 14:58:47
End at: 2018-01-10 14:59:17
Local clock offset: -1.408 ms
Remote clock offset: -4.523 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 7.51 Mbit/s
95th percentile per-packet one-way delay: 101.554 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 2.16 Mbit/s
95th percentile per-packet one-way delay: 77.231 ms
Loss rate: 0.13%
-- Flow 2:
Average throughput: 7.00 Mbit/s
95th percentile per-packet one-way delay: 104.940 ms
Loss rate: 0.09%
-- Flow 3:
Average throughput: 2.14 Mbit/s
95th percentile per-packet one-way delay: 70.162 ms
Loss rate: 0.34%
```

## Run 1: Report of TCP Vegas — Data Link

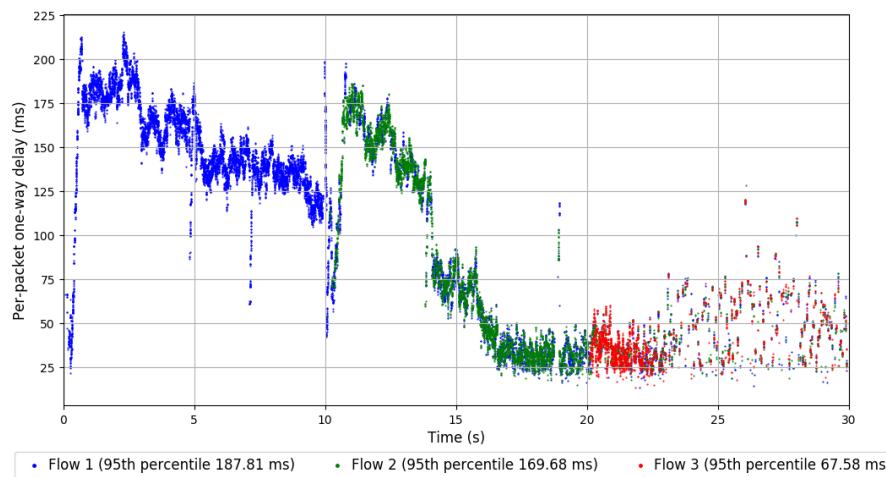
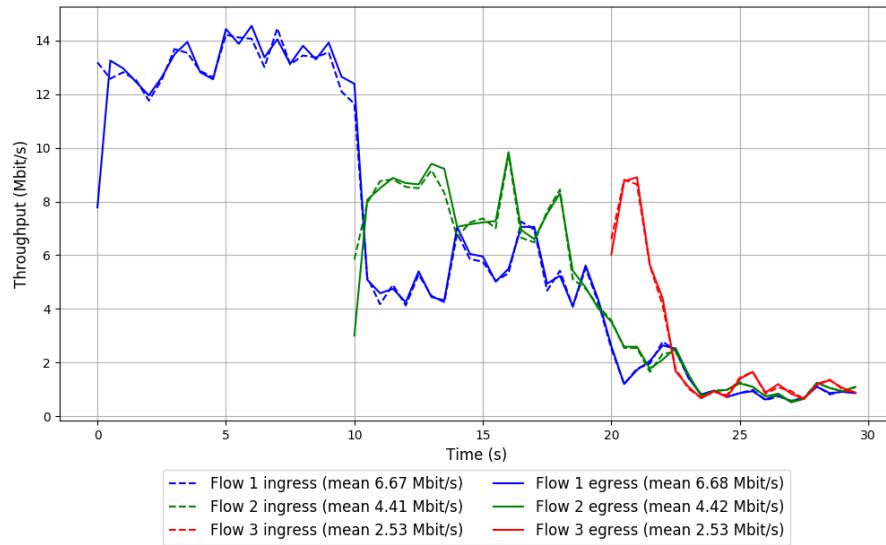


Run 2: Statistics of TCP Vegas

```
Start at: 2018-01-10 15:16:40
End at: 2018-01-10 15:17:10
Local clock offset: -1.33 ms
Remote clock offset: -4.664 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.45 Mbit/s
95th percentile per-packet one-way delay: 184.431 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 6.68 Mbit/s
95th percentile per-packet one-way delay: 187.806 ms
Loss rate: 0.10%
-- Flow 2:
Average throughput: 4.42 Mbit/s
95th percentile per-packet one-way delay: 169.676 ms
Loss rate: 0.25%
-- Flow 3:
Average throughput: 2.53 Mbit/s
95th percentile per-packet one-way delay: 67.577 ms
Loss rate: 0.24%
```

## Run 2: Report of TCP Vegas — Data Link

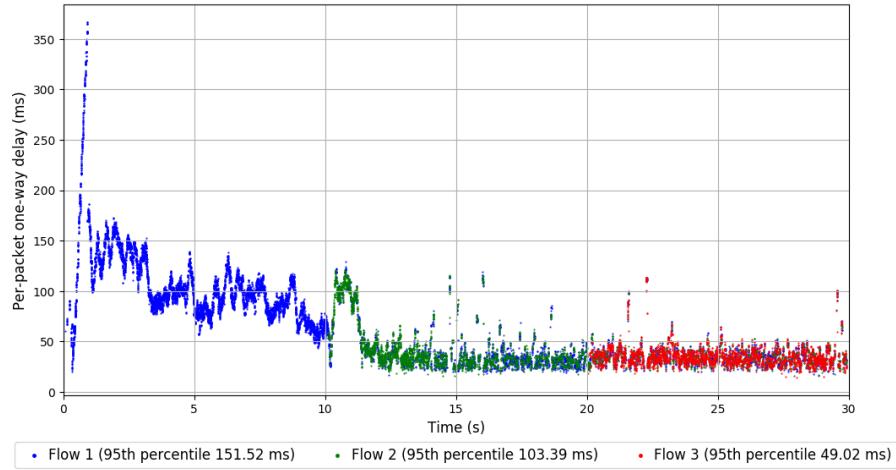
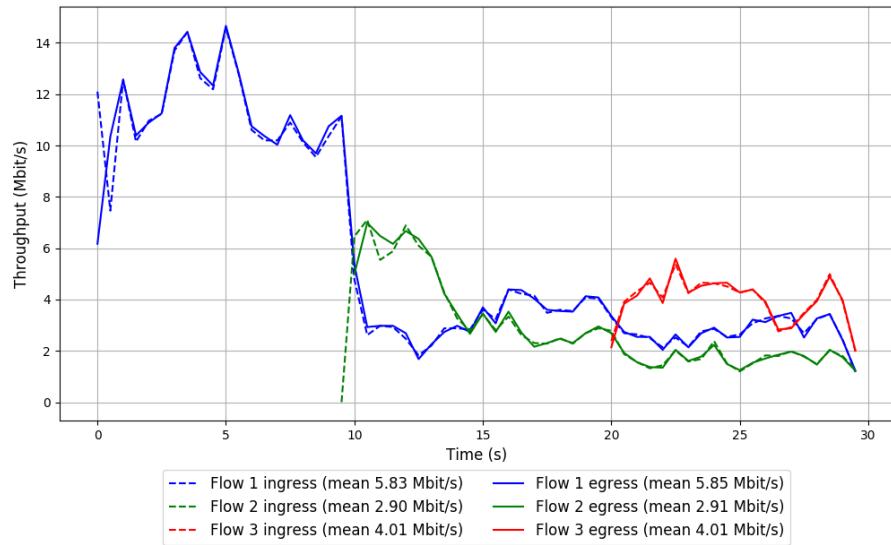


Run 3: Statistics of TCP Vegas

```
Start at: 2018-01-10 15:34:31
End at: 2018-01-10 15:35:01
Local clock offset: -1.331 ms
Remote clock offset: -4.766 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 9.10 Mbit/s
95th percentile per-packet one-way delay: 143.344 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 5.85 Mbit/s
95th percentile per-packet one-way delay: 151.519 ms
Loss rate: 0.06%
-- Flow 2:
Average throughput: 2.91 Mbit/s
95th percentile per-packet one-way delay: 103.394 ms
Loss rate: 0.29%
-- Flow 3:
Average throughput: 4.01 Mbit/s
95th percentile per-packet one-way delay: 49.019 ms
Loss rate: 0.36%
```

### Run 3: Report of TCP Vegas — Data Link

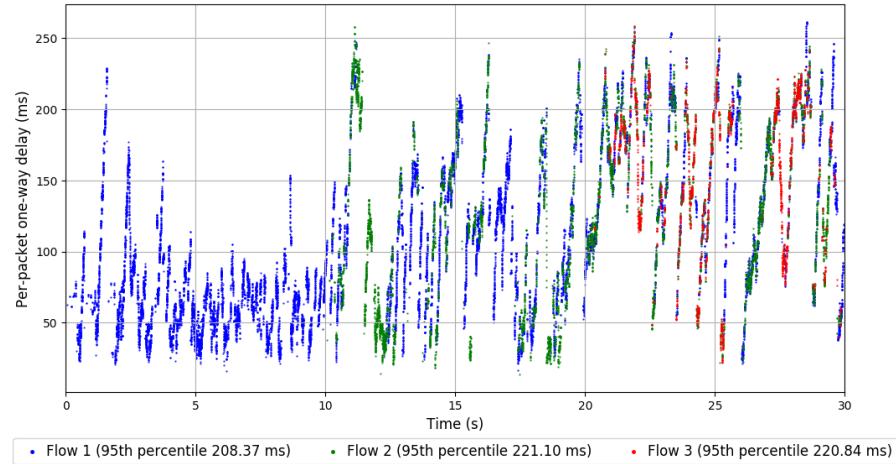
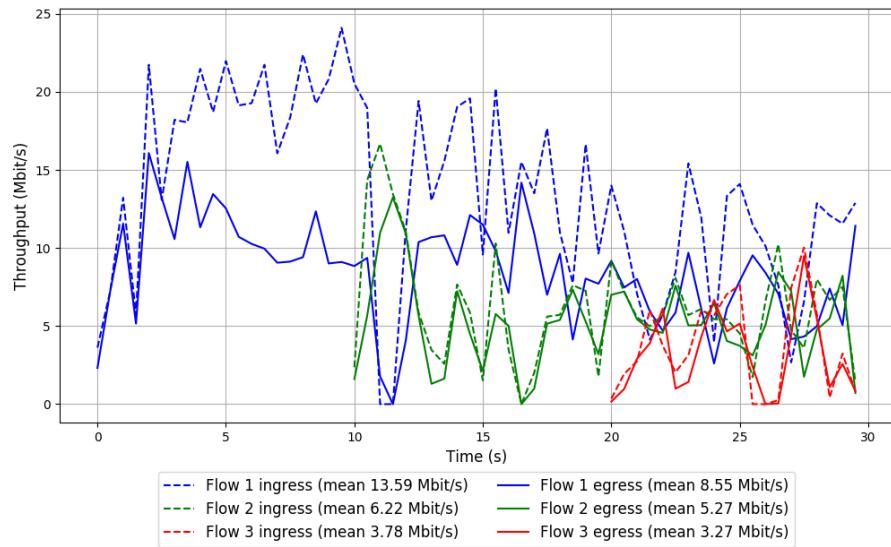


Run 1: Statistics of Verus

```
Start at: 2018-01-10 14:55:13
End at: 2018-01-10 14:55:43
Local clock offset: -1.542 ms
Remote clock offset: -4.584 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 13.11 Mbit/s
95th percentile per-packet one-way delay: 214.580 ms
Loss rate: 30.82%
-- Flow 1:
Average throughput: 8.55 Mbit/s
95th percentile per-packet one-way delay: 208.371 ms
Loss rate: 36.99%
-- Flow 2:
Average throughput: 5.27 Mbit/s
95th percentile per-packet one-way delay: 221.105 ms
Loss rate: 15.49%
-- Flow 3:
Average throughput: 3.27 Mbit/s
95th percentile per-packet one-way delay: 220.843 ms
Loss rate: 14.44%
```

## Run 1: Report of Verus — Data Link

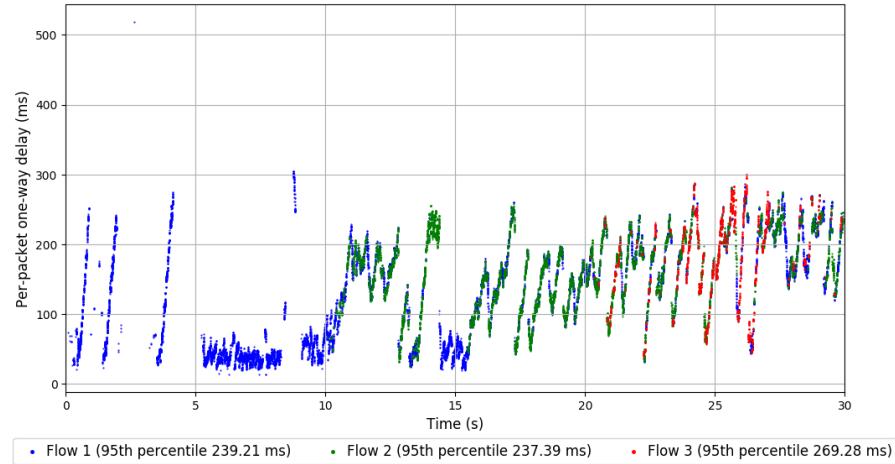
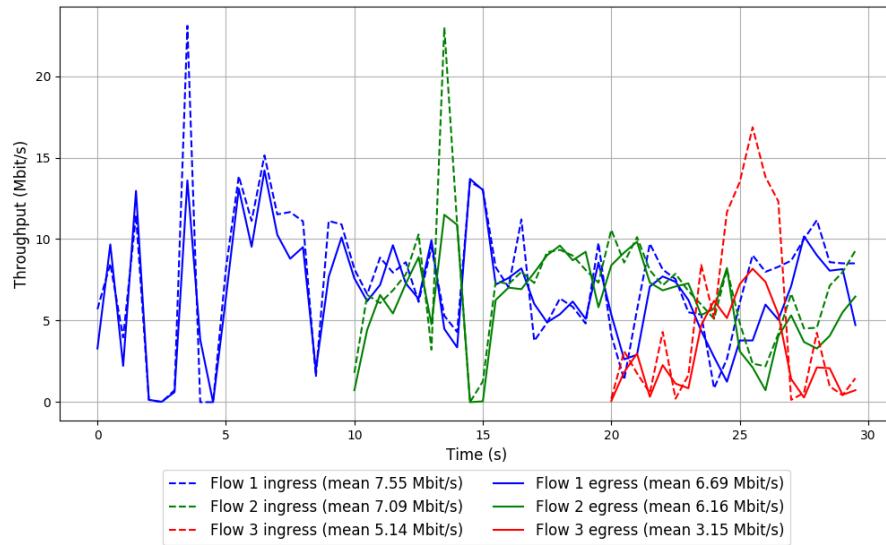


Run 2: Statistics of Verus

```
Start at: 2018-01-10 15:13:05
End at: 2018-01-10 15:13:35
Local clock offset: -1.233 ms
Remote clock offset: -4.743 ms

# Below is generated by plot.py at 2018-01-10 16:35:55
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.81 Mbit/s
95th percentile per-packet one-way delay: 242.598 ms
Loss rate: 15.64%
-- Flow 1:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 239.205 ms
Loss rate: 11.52%
-- Flow 2:
Average throughput: 6.16 Mbit/s
95th percentile per-packet one-way delay: 237.390 ms
Loss rate: 13.49%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 269.283 ms
Loss rate: 39.96%
```

## Run 2: Report of Verus — Data Link

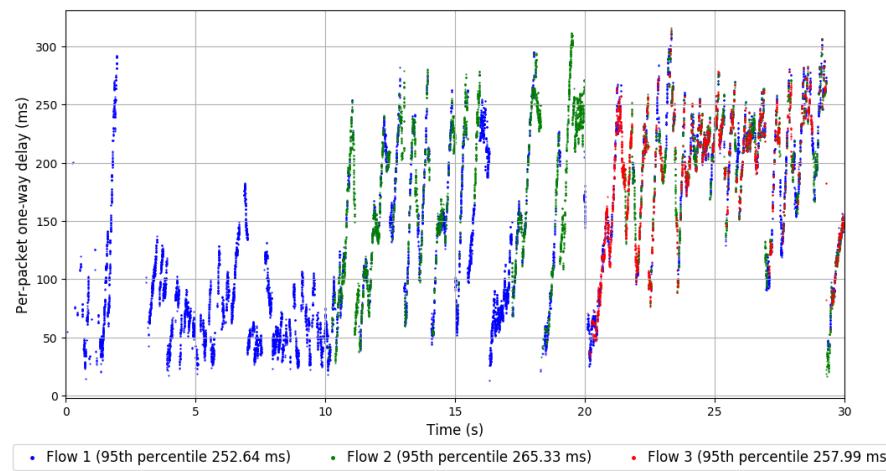
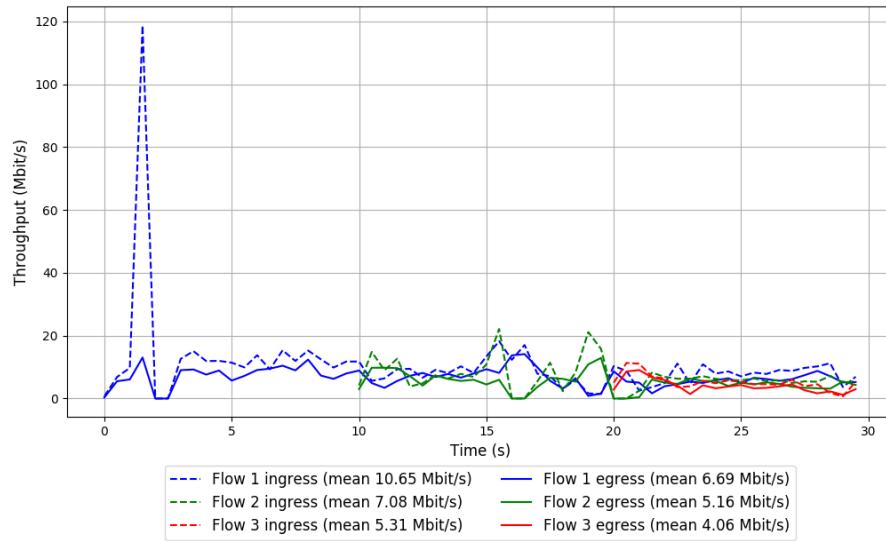


Run 3: Statistics of Verus

```
Start at: 2018-01-10 15:30:57
End at: 2018-01-10 15:31:27
Local clock offset: -1.269 ms
Remote clock offset: -4.809 ms

# Below is generated by plot.py at 2018-01-10 16:35:56
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.47 Mbit/s
95th percentile per-packet one-way delay: 258.758 ms
Loss rate: 33.19%
-- Flow 1:
Average throughput: 6.69 Mbit/s
95th percentile per-packet one-way delay: 252.643 ms
Loss rate: 37.29%
-- Flow 2:
Average throughput: 5.16 Mbit/s
95th percentile per-packet one-way delay: 265.335 ms
Loss rate: 27.27%
-- Flow 3:
Average throughput: 4.06 Mbit/s
95th percentile per-packet one-way delay: 257.990 ms
Loss rate: 24.30%
```

### Run 3: Report of Verus — Data Link

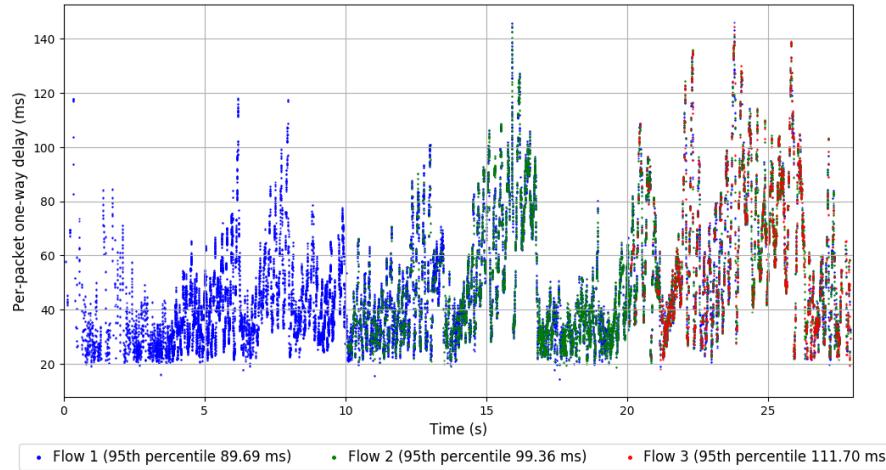
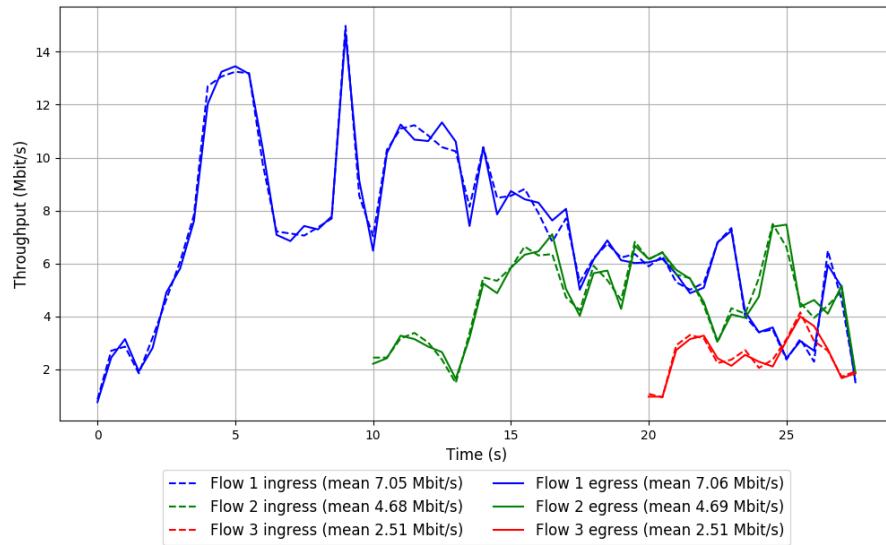


Run 1: Statistics of Copa

```
Start at: 2018-01-10 15:03:32
End at: 2018-01-10 15:04:02
Local clock offset: -1.447 ms
Remote clock offset: -4.34 ms

# Below is generated by plot.py at 2018-01-10 16:36:10
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.78 Mbit/s
95th percentile per-packet one-way delay: 94.514 ms
Loss rate: 0.13%
-- Flow 1:
Average throughput: 7.06 Mbit/s
95th percentile per-packet one-way delay: 89.686 ms
Loss rate: 0.07%
-- Flow 2:
Average throughput: 4.69 Mbit/s
95th percentile per-packet one-way delay: 99.360 ms
Loss rate: 0.14%
-- Flow 3:
Average throughput: 2.51 Mbit/s
95th percentile per-packet one-way delay: 111.699 ms
Loss rate: 0.72%
```

## Run 1: Report of Copa — Data Link

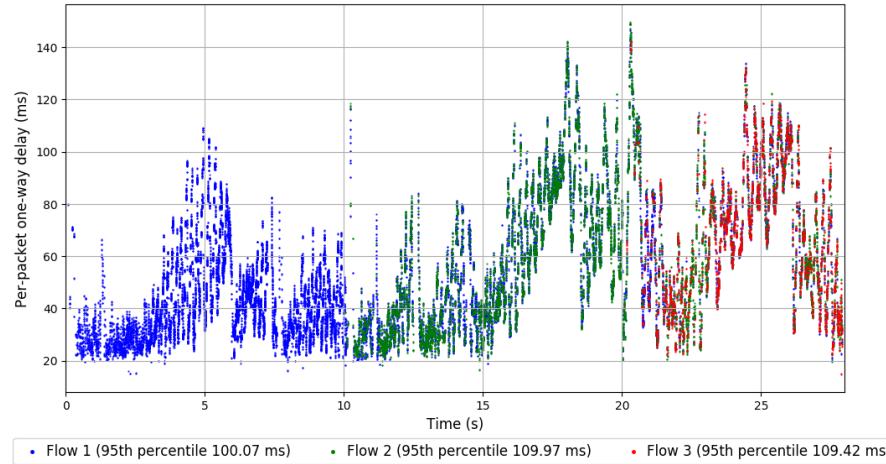
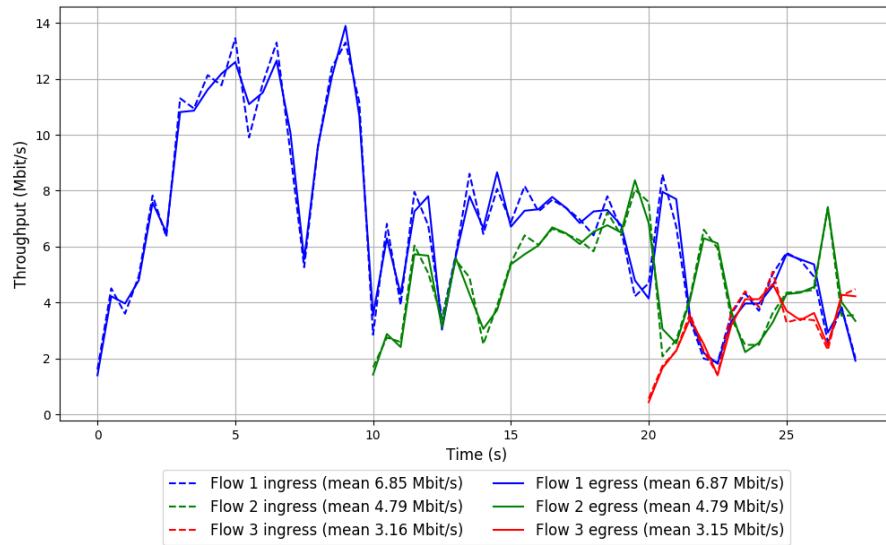


Run 2: Statistics of Copa

```
Start at: 2018-01-10 15:21:25
End at: 2018-01-10 15:21:55
Local clock offset: -1.259 ms
Remote clock offset: -4.579 ms

# Below is generated by plot.py at 2018-01-10 16:36:14
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.83 Mbit/s
95th percentile per-packet one-way delay: 105.034 ms
Loss rate: 0.26%
-- Flow 1:
Average throughput: 6.87 Mbit/s
95th percentile per-packet one-way delay: 100.074 ms
Loss rate: 0.11%
-- Flow 2:
Average throughput: 4.79 Mbit/s
95th percentile per-packet one-way delay: 109.967 ms
Loss rate: 0.38%
-- Flow 3:
Average throughput: 3.15 Mbit/s
95th percentile per-packet one-way delay: 109.417 ms
Loss rate: 1.04%
```

## Run 2: Report of Copa — Data Link

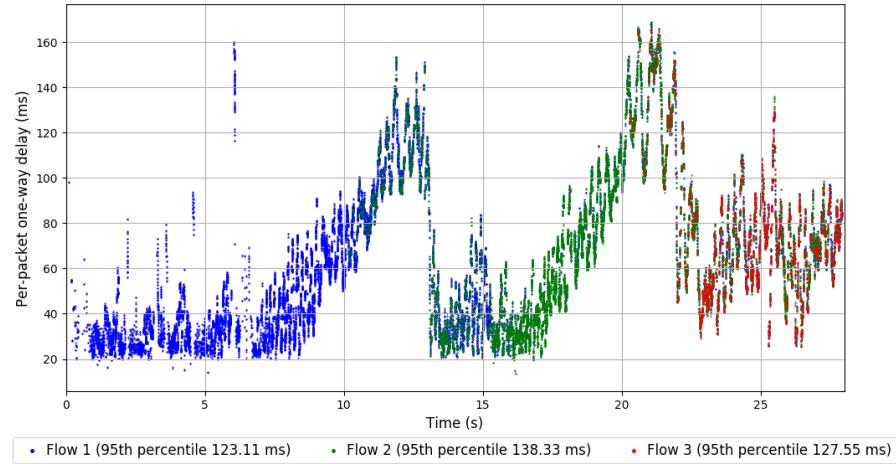
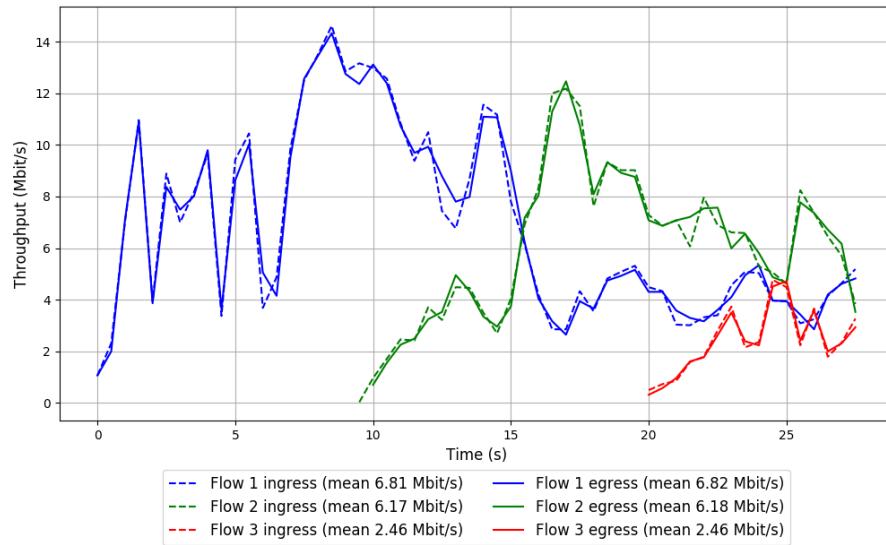


Run 3: Statistics of Copa

```
Start at: 2018-01-10 15:39:16
End at: 2018-01-10 15:39:46
Local clock offset: -1.367 ms
Remote clock offset: -4.602 ms

# Below is generated by plot.py at 2018-01-10 16:36:16
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.48 Mbit/s
95th percentile per-packet one-way delay: 128.327 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 6.82 Mbit/s
95th percentile per-packet one-way delay: 123.106 ms
Loss rate: 0.27%
-- Flow 2:
Average throughput: 6.18 Mbit/s
95th percentile per-packet one-way delay: 138.330 ms
Loss rate: 0.36%
-- Flow 3:
Average throughput: 2.46 Mbit/s
95th percentile per-packet one-way delay: 127.553 ms
Loss rate: 1.59%
```

### Run 3: Report of Copa — Data Link

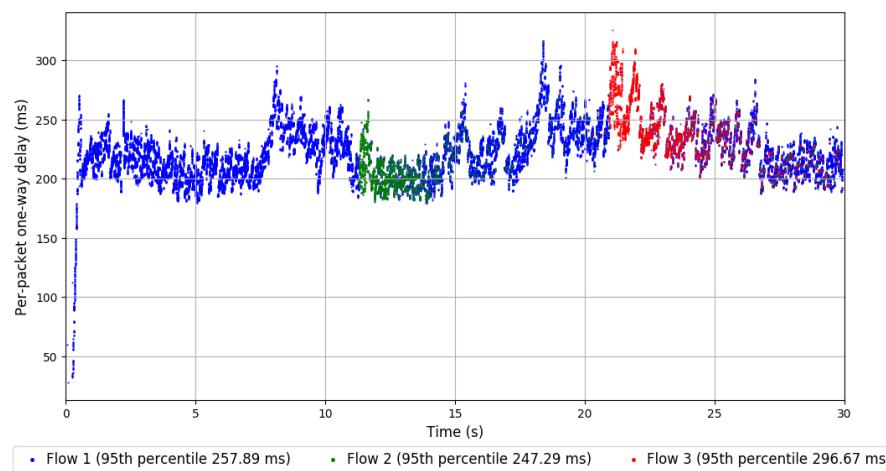
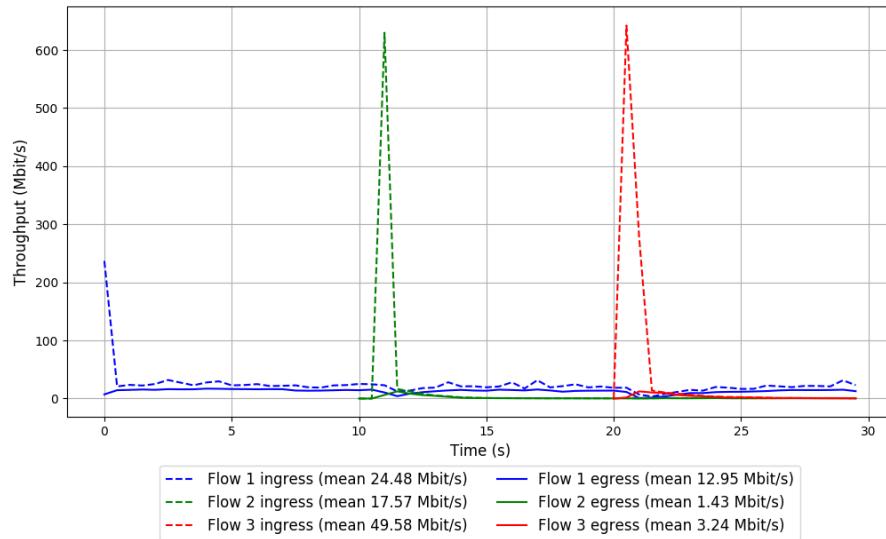


```
Run 1: Statistics of FillP

Start at: 2018-01-10 14:46:52
End at: 2018-01-10 14:47:22
Local clock offset: -1.662 ms
Remote clock offset: -4.625 ms

# Below is generated by plot.py at 2018-01-10 16:36:22
# Datalink statistics
-- Total of 3 flows:
Average throughput: 14.94 Mbit/s
95th percentile per-packet one-way delay: 262.091 ms
Loss rate: 71.63%
-- Flow 1:
Average throughput: 12.95 Mbit/s
95th percentile per-packet one-way delay: 257.892 ms
Loss rate: 47.22%
-- Flow 2:
Average throughput: 1.43 Mbit/s
95th percentile per-packet one-way delay: 247.289 ms
Loss rate: 91.96%
-- Flow 3:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 296.670 ms
Loss rate: 93.65%
```

## Run 1: Report of FillP — Data Link

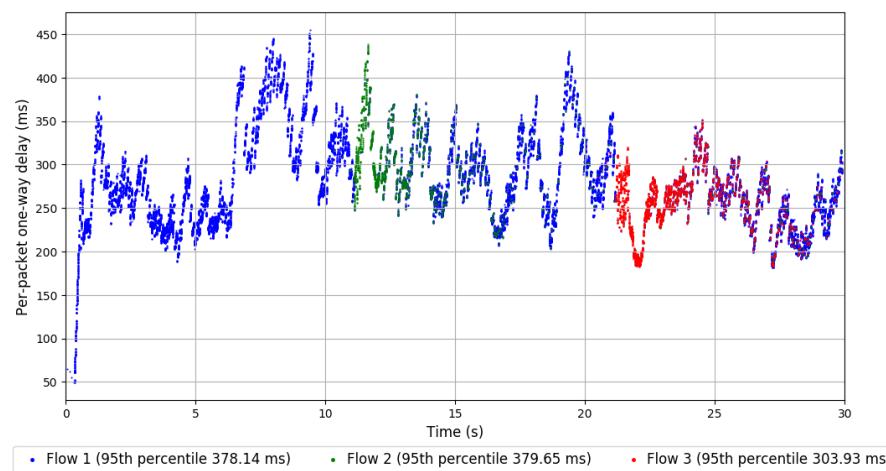
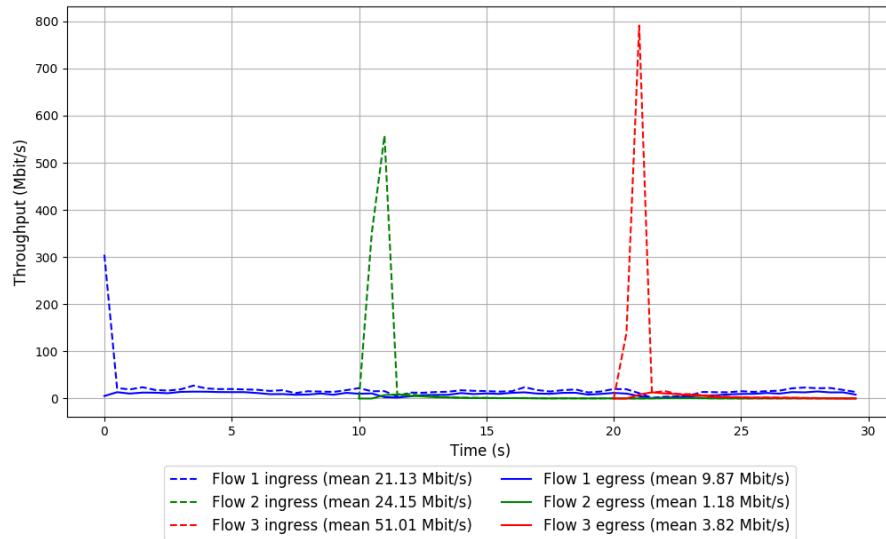


Run 2: Statistics of FillP

```
Start at: 2018-01-10 15:04:44
End at: 2018-01-10 15:05:14
Local clock offset: -1.348 ms
Remote clock offset: -4.372 ms

# Below is generated by plot.py at 2018-01-10 16:36:22
# Datalink statistics
-- Total of 3 flows:
Average throughput: 11.84 Mbit/s
95th percentile per-packet one-way delay: 374.061 ms
Loss rate: 78.14%
-- Flow 1:
Average throughput: 9.87 Mbit/s
95th percentile per-packet one-way delay: 378.139 ms
Loss rate: 53.42%
-- Flow 2:
Average throughput: 1.18 Mbit/s
95th percentile per-packet one-way delay: 379.648 ms
Loss rate: 95.21%
-- Flow 3:
Average throughput: 3.82 Mbit/s
95th percentile per-packet one-way delay: 303.932 ms
Loss rate: 92.88%
```

## Run 2: Report of FillP — Data Link

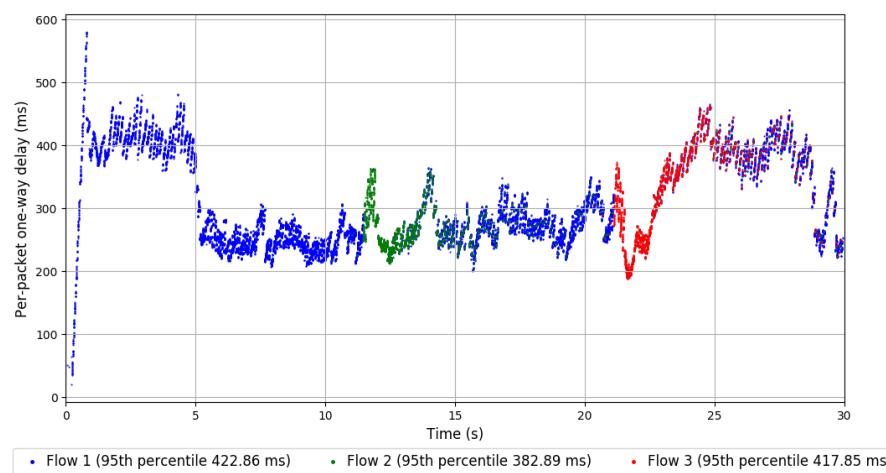
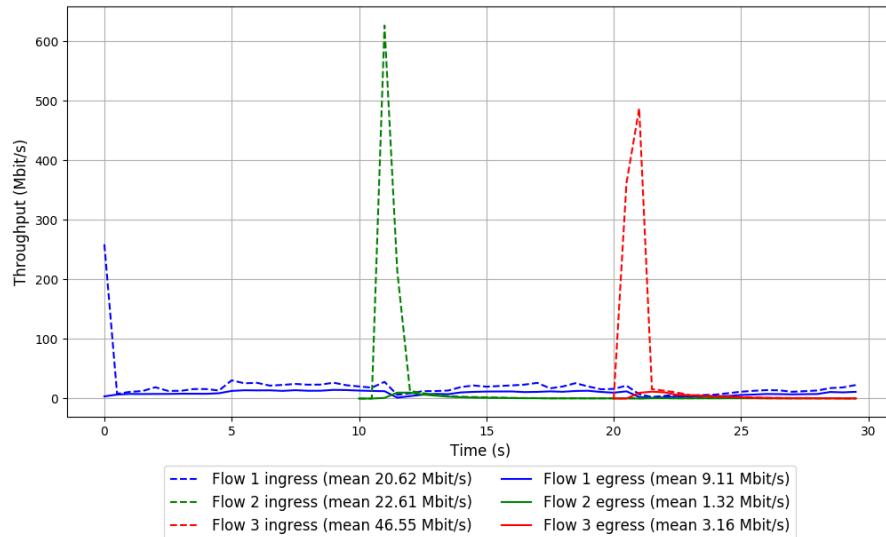


Run 3: Statistics of FillP

```
Start at: 2018-01-10 15:22:37
End at: 2018-01-10 15:23:07
Local clock offset: -1.349 ms
Remote clock offset: -4.556 ms

# Below is generated by plot.py at 2018-01-10 16:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 10.98 Mbit/s
95th percentile per-packet one-way delay: 420.761 ms
Loss rate: 78.49%
-- Flow 1:
Average throughput: 9.11 Mbit/s
95th percentile per-packet one-way delay: 422.862 ms
Loss rate: 55.95%
-- Flow 2:
Average throughput: 1.32 Mbit/s
95th percentile per-packet one-way delay: 382.887 ms
Loss rate: 94.23%
-- Flow 3:
Average throughput: 3.16 Mbit/s
95th percentile per-packet one-way delay: 417.852 ms
Loss rate: 93.42%
```

### Run 3: Report of FillP — Data Link

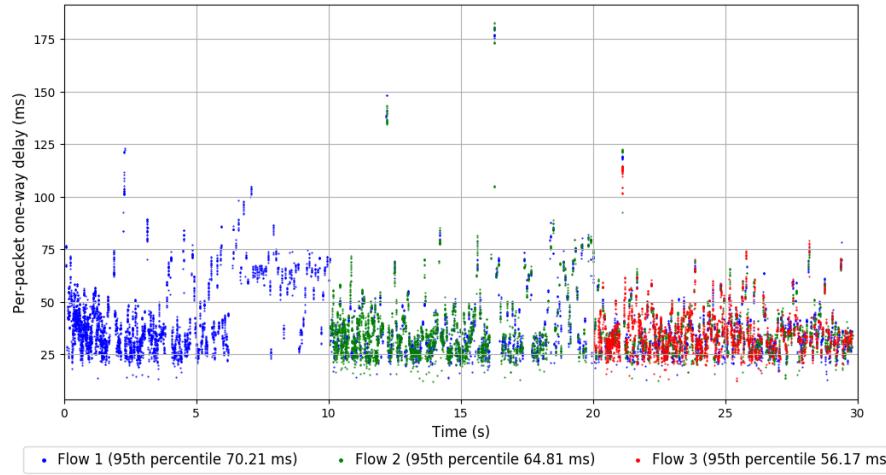
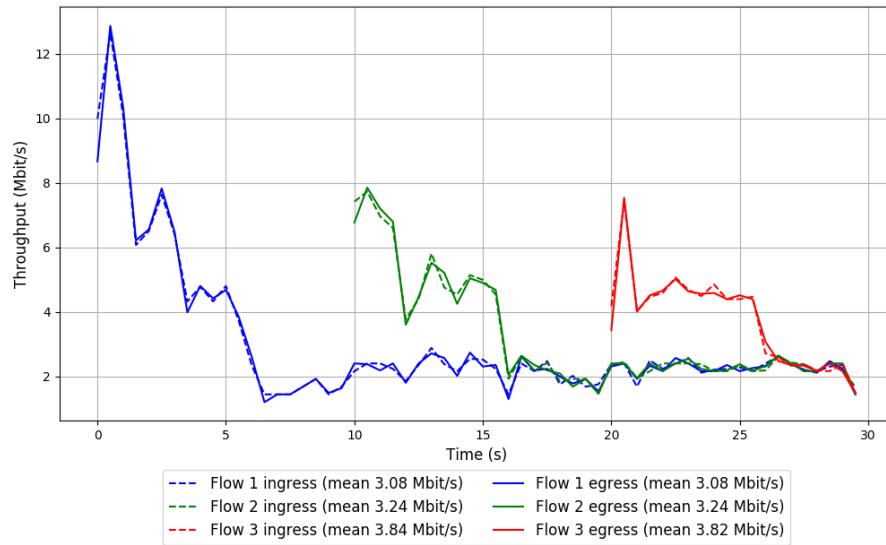


Run 1: Statistics of Indigo

```
Start at: 2018-01-10 14:49:17
End at: 2018-01-10 14:49:47
Local clock offset: -1.563 ms
Remote clock offset: -4.53 ms

# Below is generated by plot.py at 2018-01-10 16:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 6.48 Mbit/s
95th percentile per-packet one-way delay: 66.672 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 3.08 Mbit/s
95th percentile per-packet one-way delay: 70.206 ms
Loss rate: 0.34%
-- Flow 2:
Average throughput: 3.24 Mbit/s
95th percentile per-packet one-way delay: 64.815 ms
Loss rate: 0.21%
-- Flow 3:
Average throughput: 3.82 Mbit/s
95th percentile per-packet one-way delay: 56.169 ms
Loss rate: 0.77%
```

Run 1: Report of Indigo — Data Link

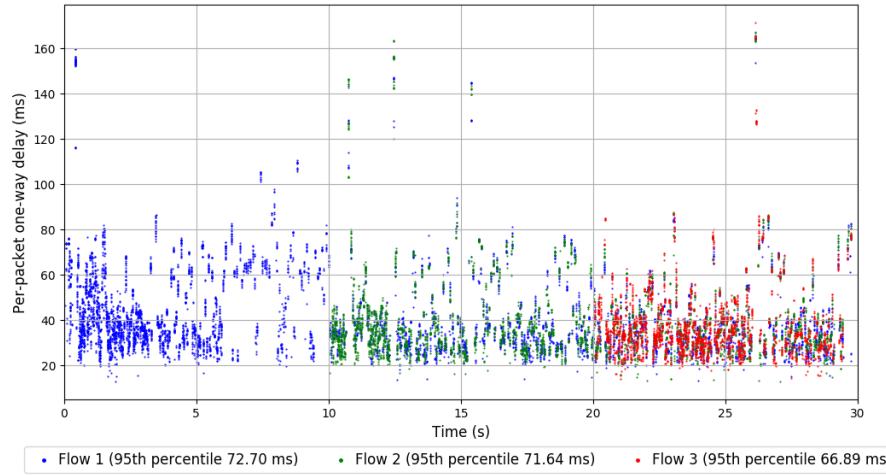
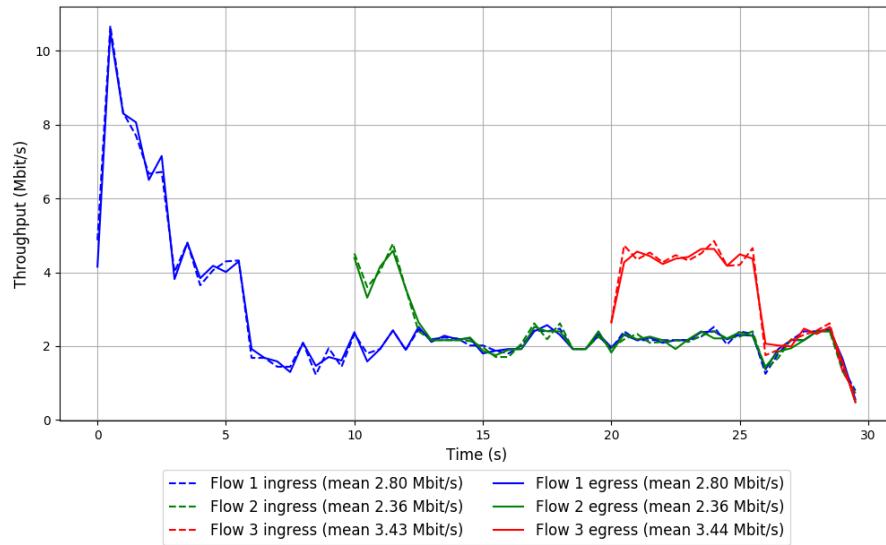


Run 2: Statistics of Indigo

```
Start at: 2018-01-10 15:07:08
End at: 2018-01-10 15:07:38
Local clock offset: -1.315 ms
Remote clock offset: -4.534 ms

# Below is generated by plot.py at 2018-01-10 16:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.49 Mbit/s
95th percentile per-packet one-way delay: 72.151 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.80 Mbit/s
95th percentile per-packet one-way delay: 72.696 ms
Loss rate: 0.14%
-- Flow 2:
Average throughput: 2.36 Mbit/s
95th percentile per-packet one-way delay: 71.641 ms
Loss rate: 0.26%
-- Flow 3:
Average throughput: 3.44 Mbit/s
95th percentile per-packet one-way delay: 66.888 ms
Loss rate: 0.36%
```

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

```
Start at: 2018-01-10 15:25:01
End at: 2018-01-10 15:25:31
Local clock offset: -1.326 ms
Remote clock offset: -4.635 ms

# Below is generated by plot.py at 2018-01-10 16:36:23
# Datalink statistics
-- Total of 3 flows:
Average throughput: 5.71 Mbit/s
95th percentile per-packet one-way delay: 72.438 ms
Loss rate: 0.22%
-- Flow 1:
Average throughput: 2.69 Mbit/s
95th percentile per-packet one-way delay: 77.519 ms
Loss rate: 0.15%
-- Flow 2:
Average throughput: 2.78 Mbit/s
95th percentile per-packet one-way delay: 66.838 ms
Loss rate: 0.22%
-- Flow 3:
Average throughput: 3.59 Mbit/s
95th percentile per-packet one-way delay: 53.868 ms
Loss rate: 0.38%
```

### Run 3: Report of Indigo — Data Link

