

## Pantheon Report

Generated at 2017-12-20 19:45:33 (UTC).

Data path: Colombia ppp0 (*remote*) → AWS Brazil 2 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).

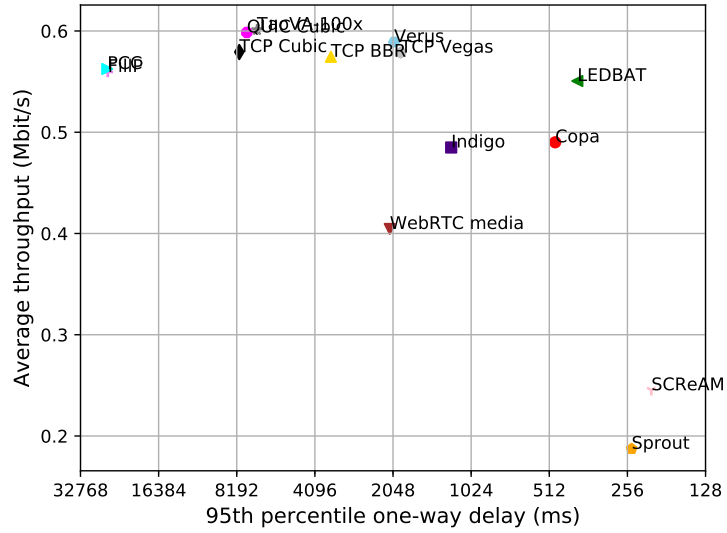
Tested BBR with qdisc of Fair Queuing (*fq*), and other schemes with the default Linux qdisc (*pfifo\_fast*).

NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

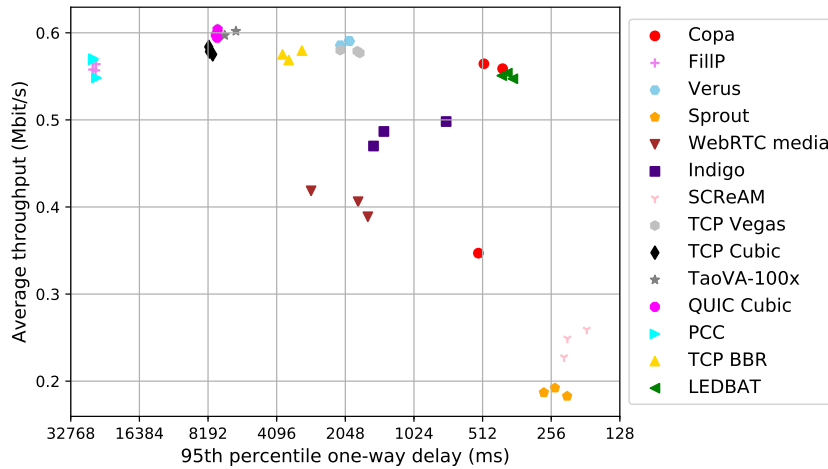
Git summary:

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



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



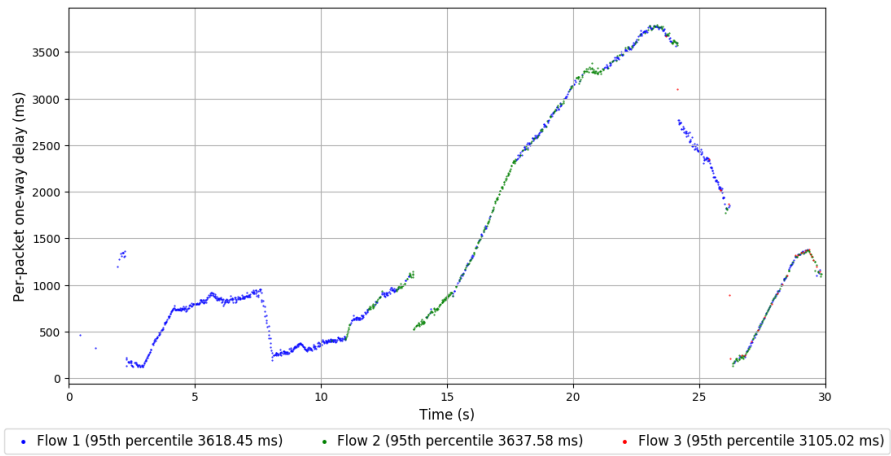
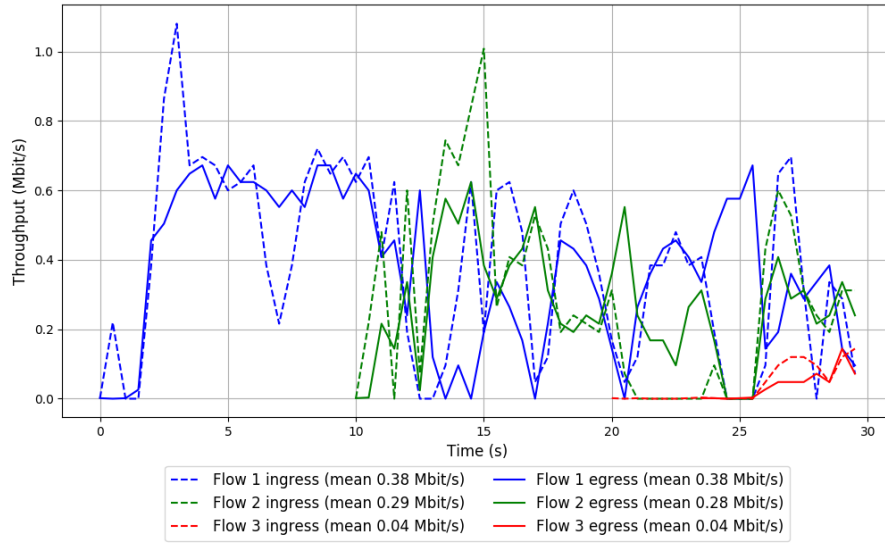
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.37	0.30	0.03	3528.96	3571.75	3297.22	2.85	6.65	42.49
TCP Cubic	3	0.57	0.03	0.00	8010.65	6267.31	8352.82	30.96	46.41	75.13
LEDBAT	3	0.25	0.38	0.18	336.22	412.23	433.20	0.11	1.74	7.52
PCC	3	0.56	0.00	N/A	25828.55	N/A	N/A	98.50	N/A	N/A
QUIC Cubic	3	0.56	0.06	0.00	7460.92	7660.51	7579.03	27.99	32.50	33.33
SCReAM	3	0.08	0.17	0.14	185.19	201.96	227.66	0.80	0.87	1.51
WebRTC media	3	0.21	0.15	0.05	1961.68	2088.97	2078.03	2.54	5.43	6.10
Sprout	3	0.09	0.09	0.09	694.58	206.94	237.07	1.10	3.01	4.42
TaoVA-100x	3	0.38	0.36	0.16	7165.73	6216.47	7051.60	20.20	19.77	54.17
TCP Vegas	3	0.41	0.21	0.16	1760.55	1943.88	1968.00	3.66	7.45	22.73
Verus	3	0.58	0.01	0.01	2029.47	1990.88	1898.39	4.35	6.12	11.78
Copa	3	0.43	0.21	0.22	984.62	445.82	558.93	1.08	0.47	7.51
FillIP	3	0.56	0.00	N/A	25714.64	N/A	N/A	98.33	N/A	N/A
Indigo	3	0.23	0.30	0.21	1244.71	975.95	829.99	9.75	6.32	5.19

Run 1: Statistics of TCP BBR

Start at: 2017-12-20 18:07:37  
End at: 2017-12-20 18:08:07  
Local clock offset: -0.034 ms  
Remote clock offset: 16.971 ms

# Below is generated by plot.py at 2017-12-20 19:44:59  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.57 Mbit/s  
95th percentile per-packet one-way delay: 3627.497 ms  
Loss rate: 4.53%  
-- Flow 1:  
Average throughput: 0.38 Mbit/s  
95th percentile per-packet one-way delay: 3618.446 ms  
Loss rate: 2.63%  
-- Flow 2:  
Average throughput: 0.28 Mbit/s  
95th percentile per-packet one-way delay: 3637.578 ms  
Loss rate: 6.10%  
-- Flow 3:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 3105.024 ms  
Loss rate: 35.87%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-12-20 18:26:26

End at: 2017-12-20 18:26:56

Local clock offset: -0.037 ms

Remote clock offset: 12.34 ms

# Below is generated by plot.py at 2017-12-20 19:45:00

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 3860.358 ms

Loss rate: 5.60%

-- Flow 1:

Average throughput: 0.36 Mbit/s

95th percentile per-packet one-way delay: 3820.430 ms

Loss rate: 3.41%

-- Flow 2:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 3880.449 ms

Loss rate: 7.48%

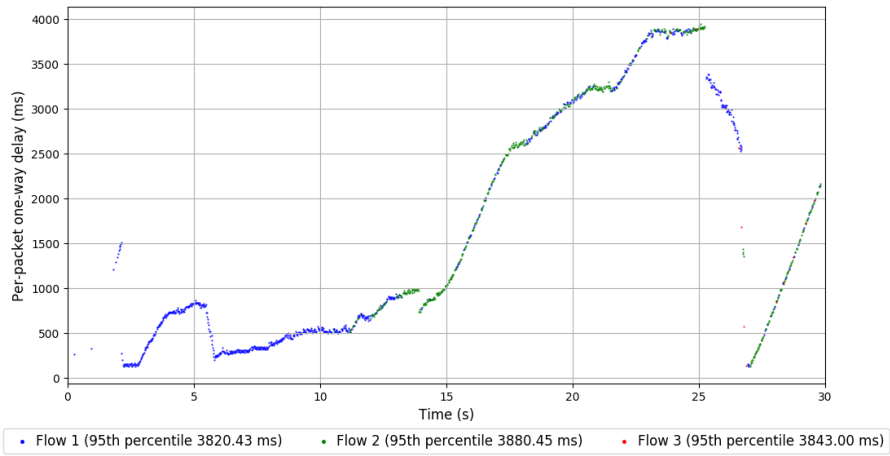
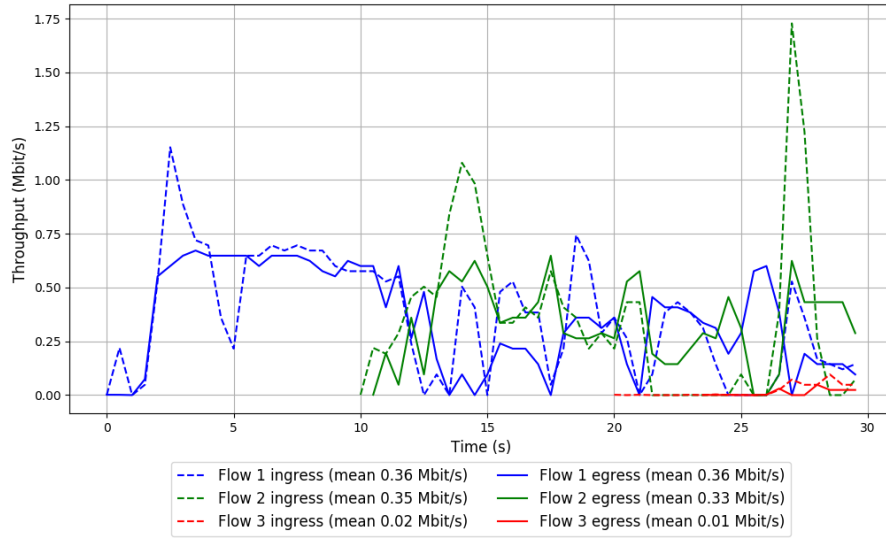
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3843.002 ms

Loss rate: 60.79%

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



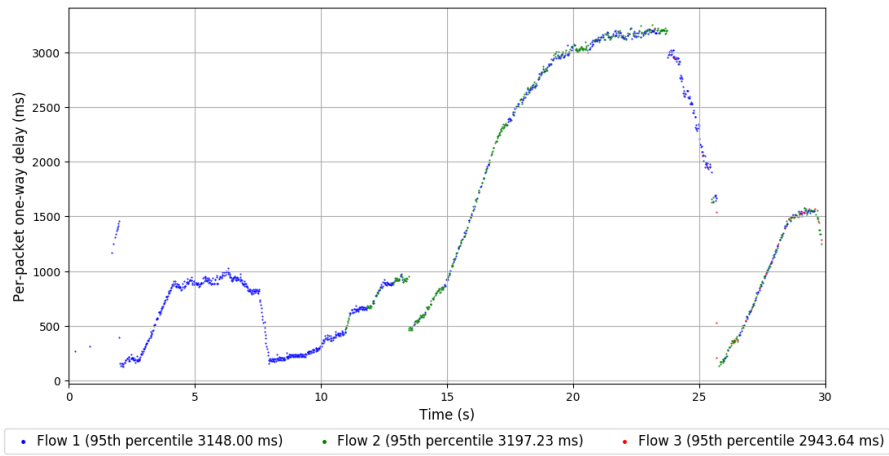
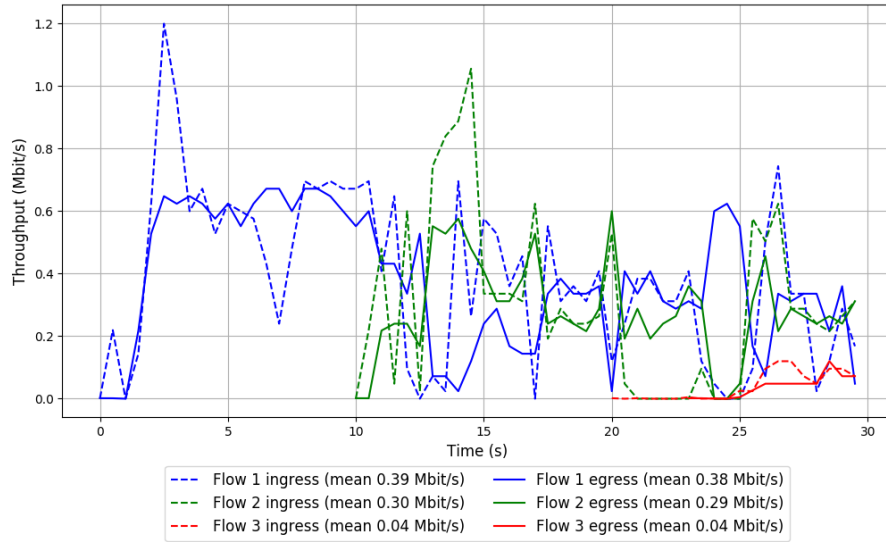
Run 3: Statistics of TCP BBR

Start at: 2017-12-20 18:45:14  
End at: 2017-12-20 18:45:44  
Local clock offset: -0.023 ms  
Remote clock offset: 17.611 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 3175.758 ms
Loss rate: 4.42%
-- Flow 1:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 3148.003 ms
Loss rate: 2.50%
-- Flow 2:
Average throughput: 0.29 Mbit/s
95th percentile per-packet one-way delay: 3197.232 ms
Loss rate: 6.37%
-- Flow 3:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 2943.638 ms
Loss rate: 30.82%
```



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

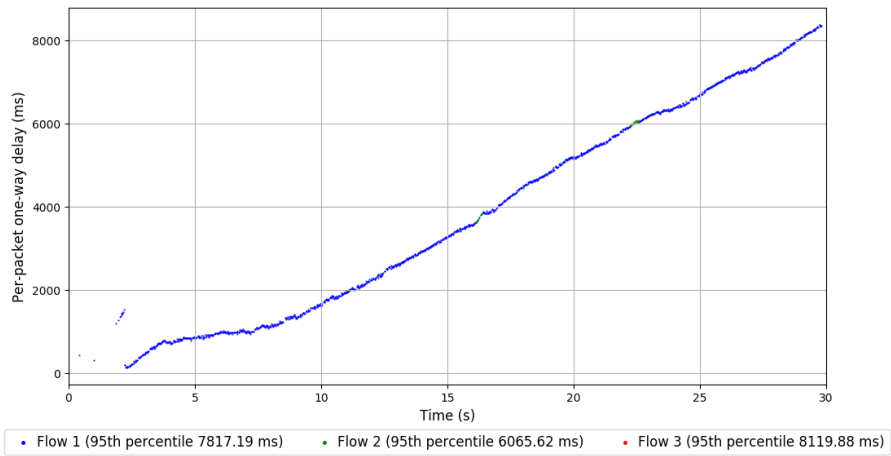
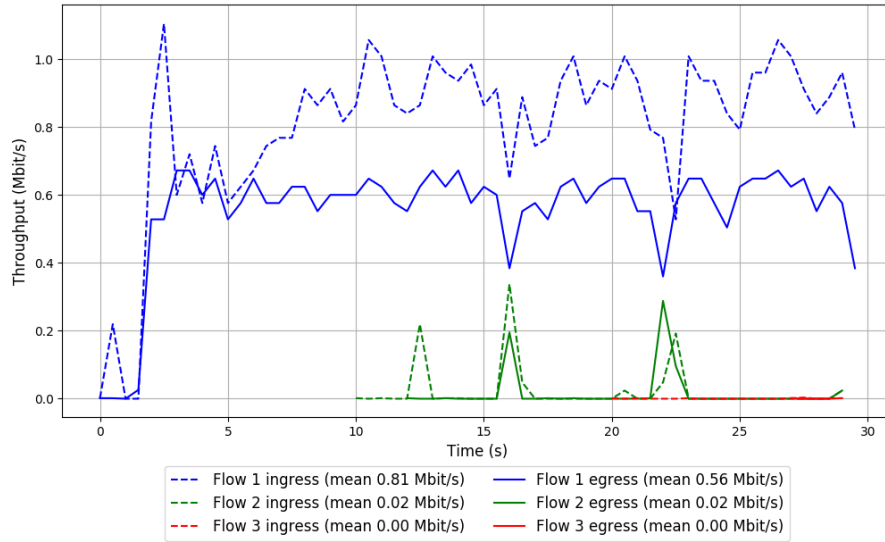


Run 1: Statistics of TCP Cubic

Start at: 2017-12-20 17:53:48  
End at: 2017-12-20 17:54:18  
Local clock offset: -0.039 ms  
Remote clock offset: 18.464 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:00
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 7817.189 ms
Loss rate: 31.18%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 7817.189 ms
Loss rate: 31.16%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 6065.625 ms
Loss rate: 32.05%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8119.880 ms
Loss rate: 75.13%
```

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

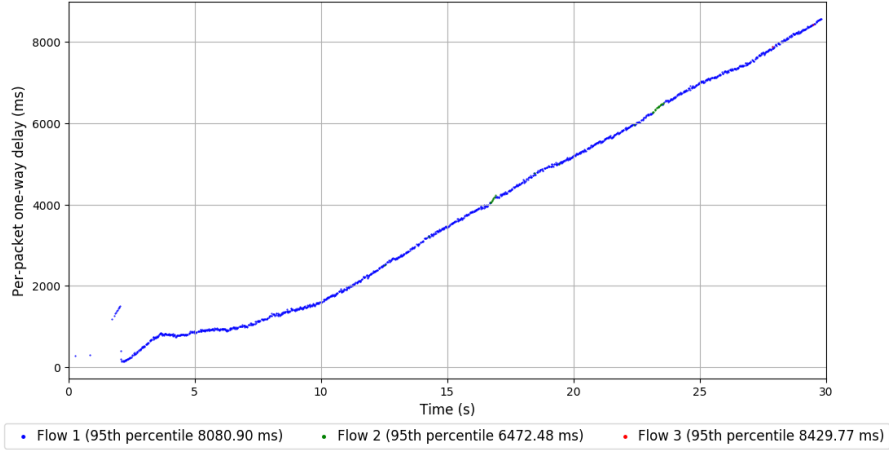
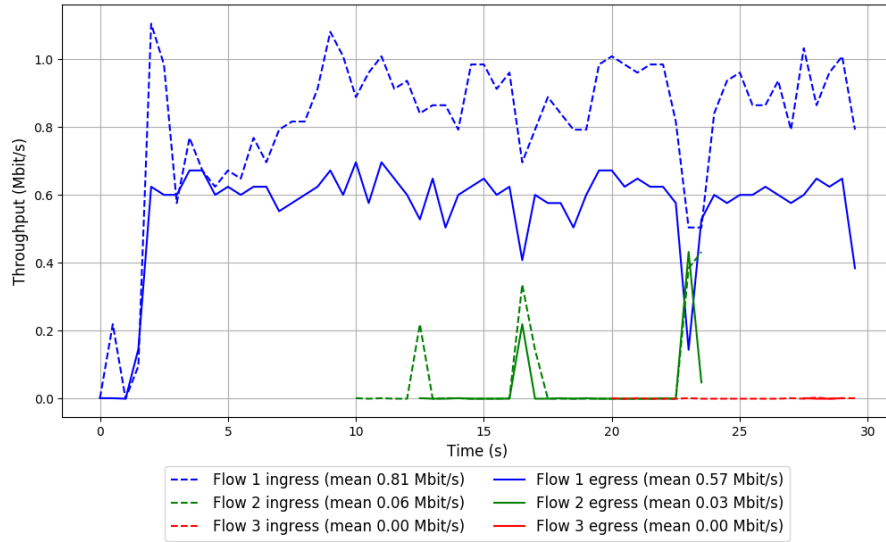


Run 2: Statistics of TCP Cubic

Start at: 2017-12-20 18:12:37  
End at: 2017-12-20 18:13:07  
Local clock offset: -0.048 ms  
Remote clock offset: 16.168 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 8080.769 ms
Loss rate: 31.75%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 8080.903 ms
Loss rate: 31.06%
-- Flow 2:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 6472.481 ms
Loss rate: 53.59%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8429.767 ms
Loss rate: 75.13%
```

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

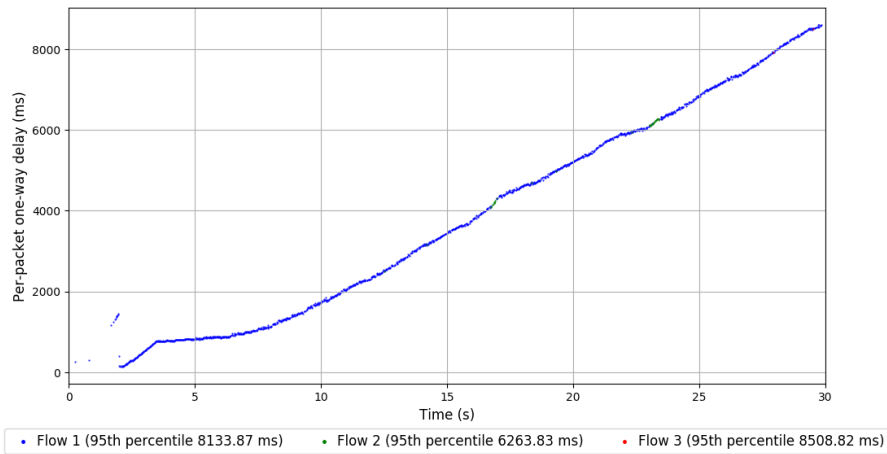
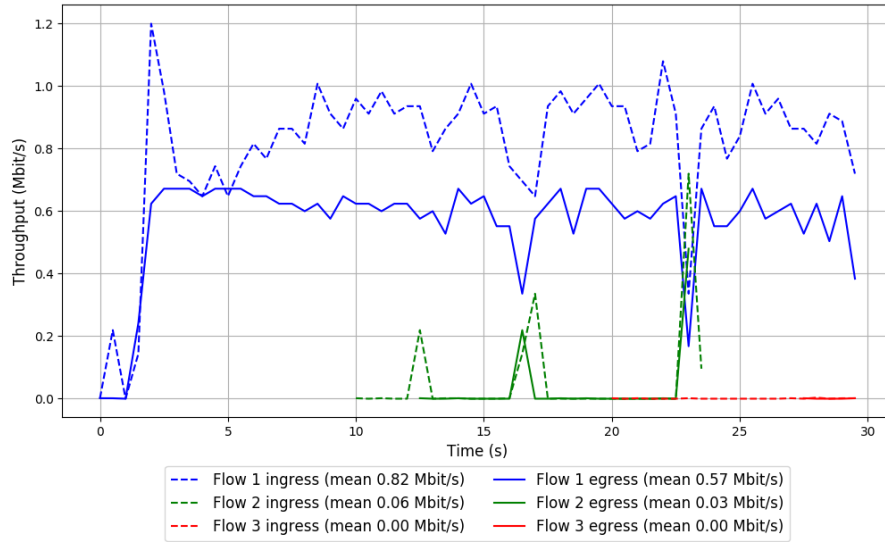


Run 3: Statistics of TCP Cubic

Start at: 2017-12-20 18:31:25  
End at: 2017-12-20 18:31:55  
Local clock offset: -0.048 ms  
Remote clock offset: 17.798 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 8133.870 ms
Loss rate: 31.36%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 8133.870 ms
Loss rate: 30.66%
-- Flow 2:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 6263.830 ms
Loss rate: 53.59%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8508.819 ms
Loss rate: 75.13%
```

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



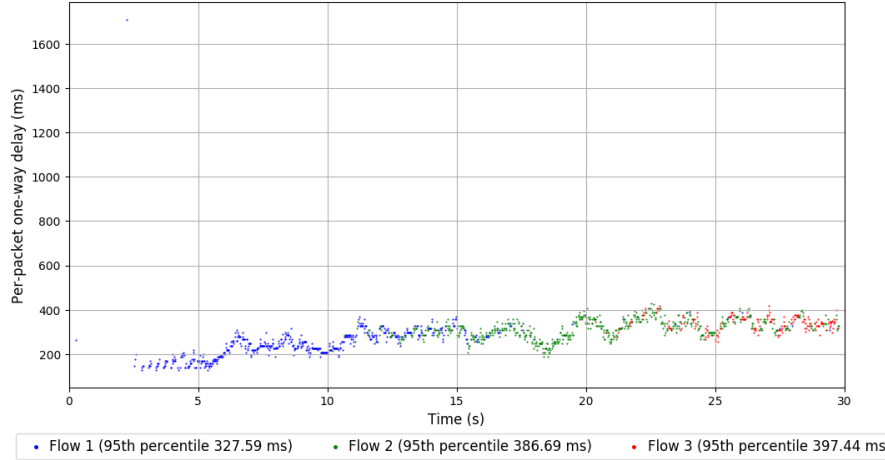
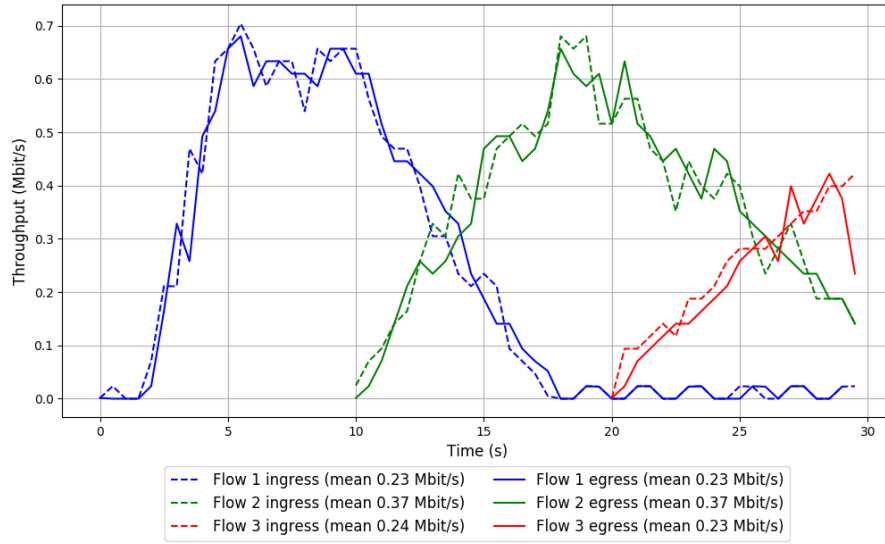
Run 1: Statistics of LEDBAT

Start at: 2017-12-20 17:57:33  
End at: 2017-12-20 17:58:03  
Local clock offset: -0.041 ms  
Remote clock offset: 17.455 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 377.133 ms
Loss rate: 1.78%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 327.588 ms
Loss rate: 0.17%
-- Flow 2:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 386.689 ms
Loss rate: 0.96%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 397.441 ms
Loss rate: 8.78%
```



# Run 1: Report of LEDBAT — Data Link

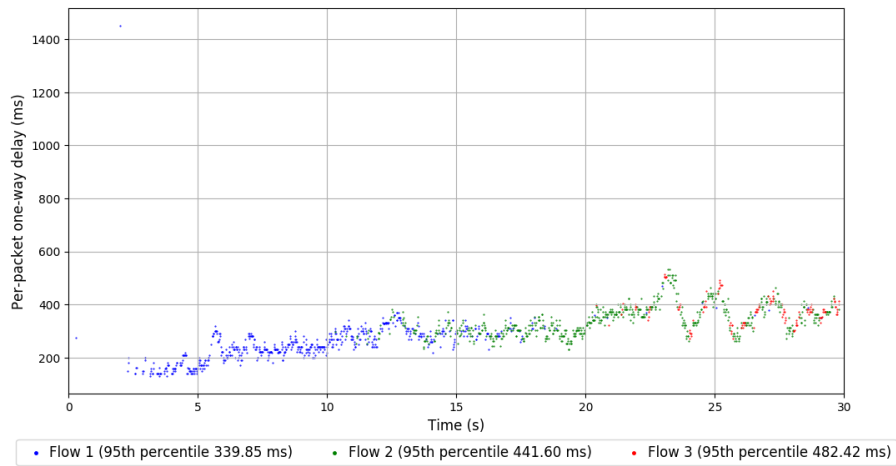
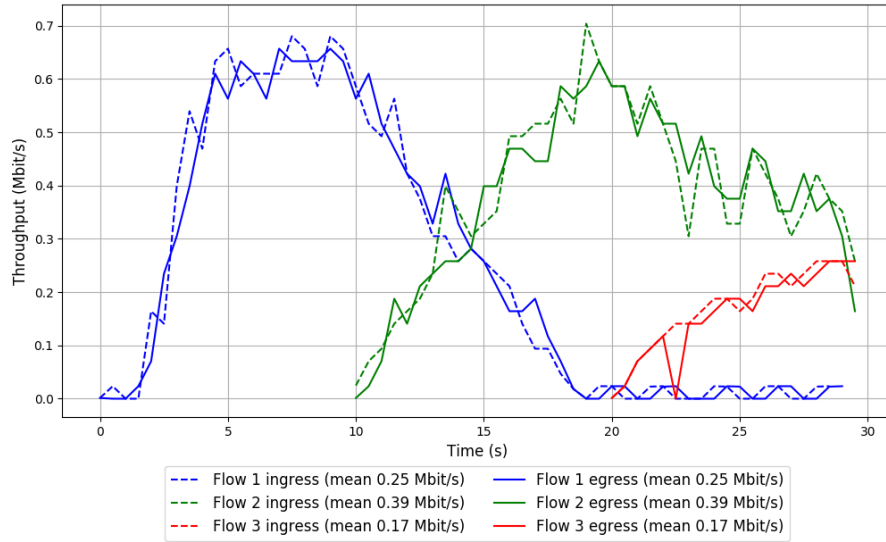


Run 2: Statistics of LEDBAT

Start at: 2017-12-20 18:16:22  
End at: 2017-12-20 18:16:52  
Local clock offset: -0.052 ms  
Remote clock offset: 11.396 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:01
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 421.958 ms
Loss rate: 1.63%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 339.853 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 441.596 ms
Loss rate: 2.11%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 482.423 ms
Loss rate: 6.25%
```

## Run 2: Report of LEDBAT — Data Link

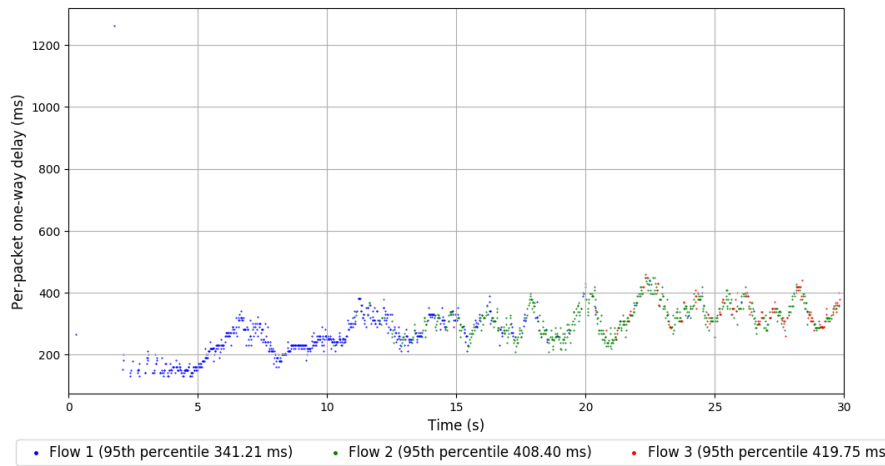
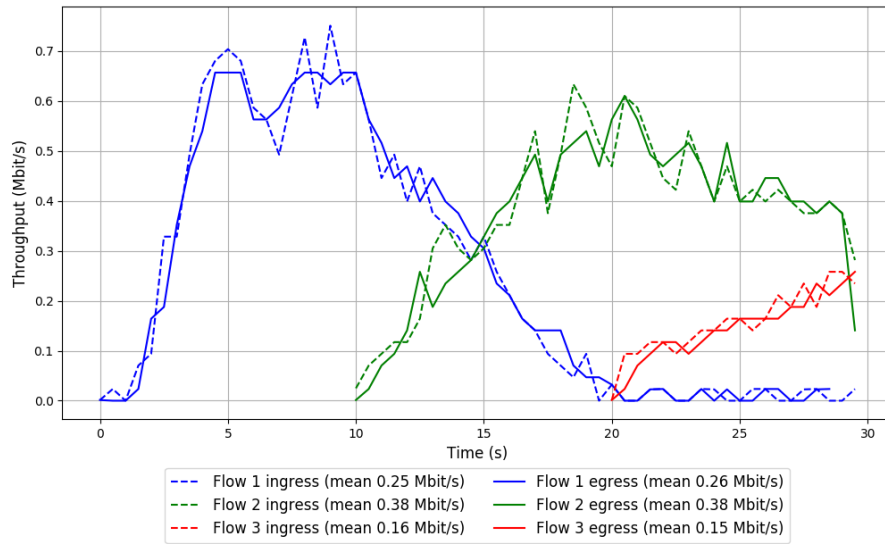


Run 3: Statistics of LEDBAT

Start at: 2017-12-20 18:35:10  
End at: 2017-12-20 18:35:40  
Local clock offset: -0.1 ms  
Remote clock offset: 16.918 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:03
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.55 Mbit/s
95th percentile per-packet one-way delay: 398.730 ms
Loss rate: 1.76%
-- Flow 1:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 341.212 ms
Loss rate: 0.16%
-- Flow 2:
Average throughput: 0.38 Mbit/s
95th percentile per-packet one-way delay: 408.399 ms
Loss rate: 2.16%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 419.749 ms
Loss rate: 7.52%
```

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

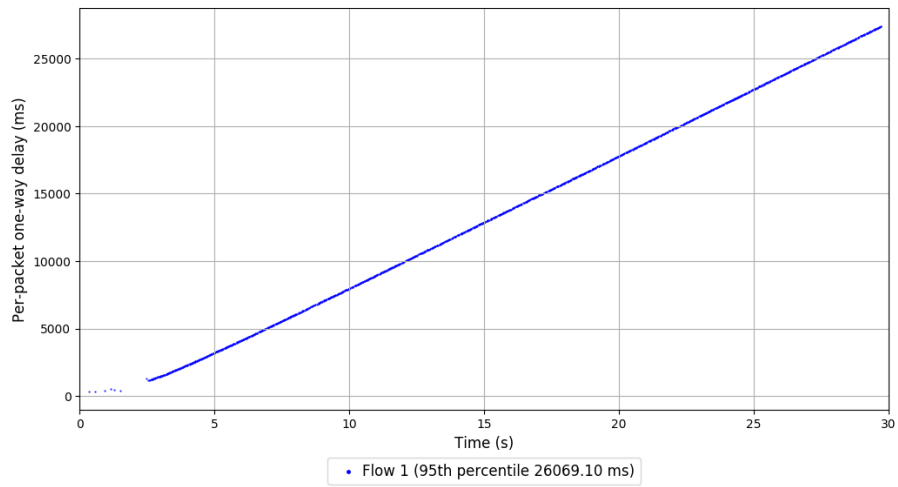
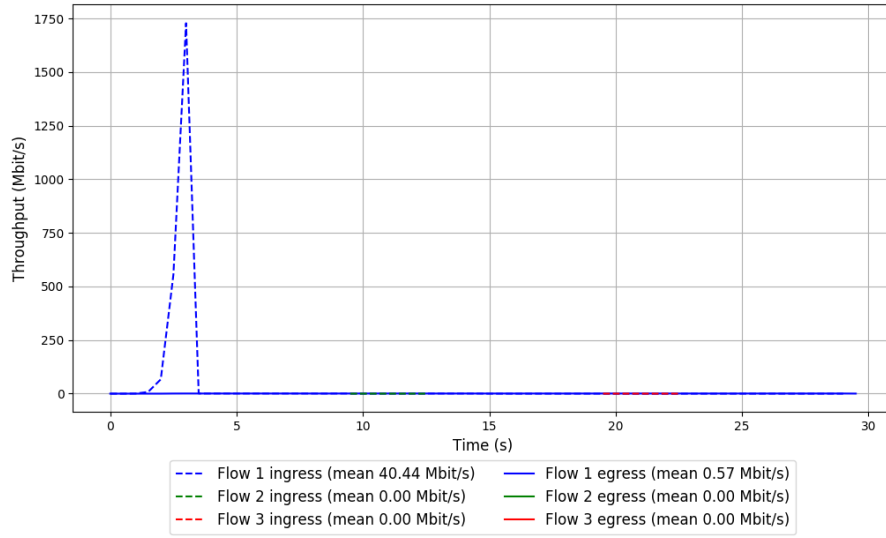


Run 1: Statistics of PCC

Start at: 2017-12-20 18:05:05  
End at: 2017-12-20 18:05:35  
Local clock offset: -0.038 ms  
Remote clock offset: 11.836 ms

# Below is generated by plot.py at 2017-12-20 19:45:28  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.57 Mbit/s  
95th percentile per-packet one-way delay: 26069.096 ms  
Loss rate: 98.59%  
-- Flow 1:  
Average throughput: 0.57 Mbit/s  
95th percentile per-packet one-way delay: 26069.096 ms  
Loss rate: 98.59%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

### Run 1: Report of PCC — Data Link



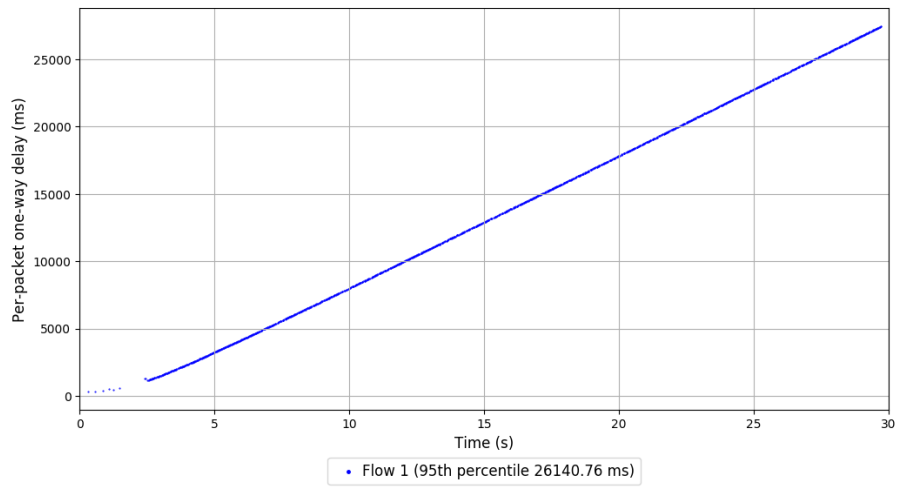
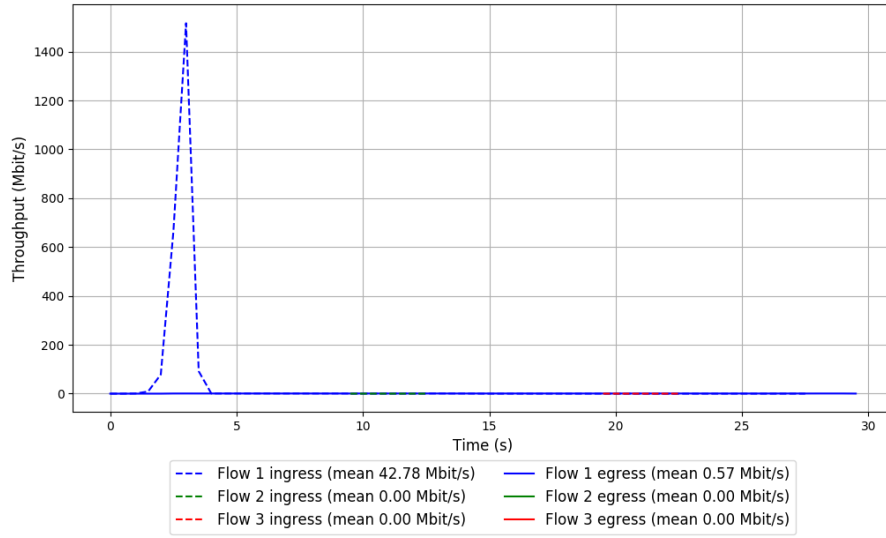
Run 2: Statistics of PCC

Start at: 2017-12-20 18:23:55  
End at: 2017-12-20 18:24:25  
Local clock offset: -0.045 ms  
Remote clock offset: 11.012 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 26140.758 ms
Loss rate: 98.59%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 26140.758 ms
Loss rate: 98.59%
-- Flow 2:
Average throughput: 0.00 Mbit/s
-- Flow 3:
Average throughput: 0.00 Mbit/s
```



## Run 2: Report of PCC — Data Link

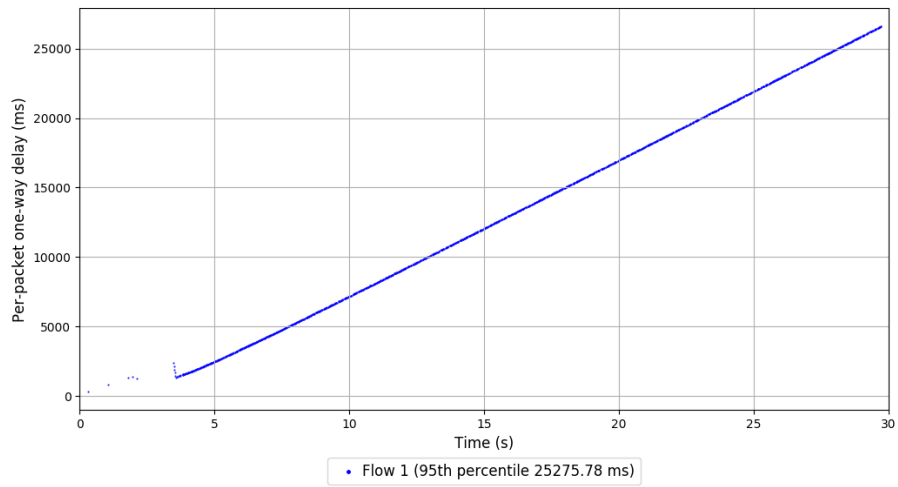
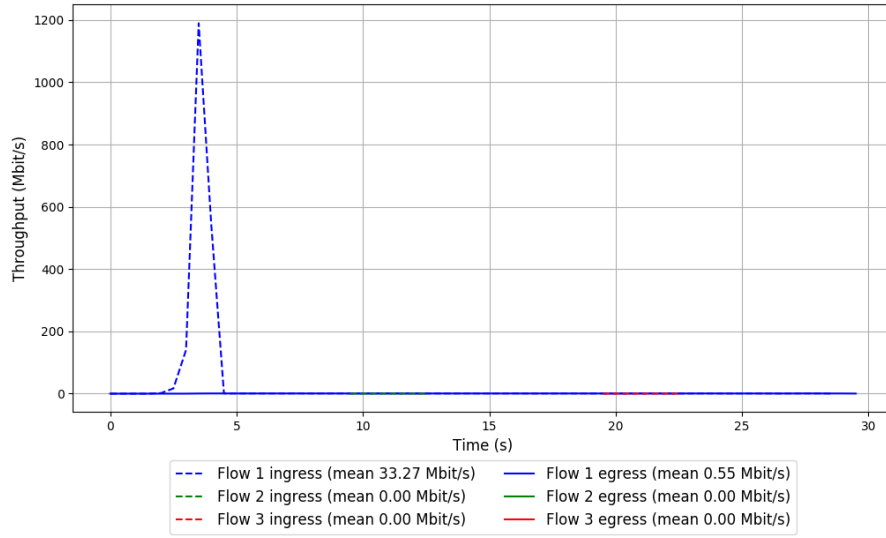


Run 3: Statistics of PCC

Start at: 2017-12-20 18:42:42  
End at: 2017-12-20 18:43:12  
Local clock offset: -0.031 ms  
Remote clock offset: 16.893 ms

# Below is generated by plot.py at 2017-12-20 19:45:28  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.55 Mbit/s  
95th percentile per-packet one-way delay: 25275.784 ms  
Loss rate: 98.32%  
-- Flow 1:  
Average throughput: 0.55 Mbit/s  
95th percentile per-packet one-way delay: 25275.784 ms  
Loss rate: 98.32%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

### Run 3: Report of PCC — Data Link

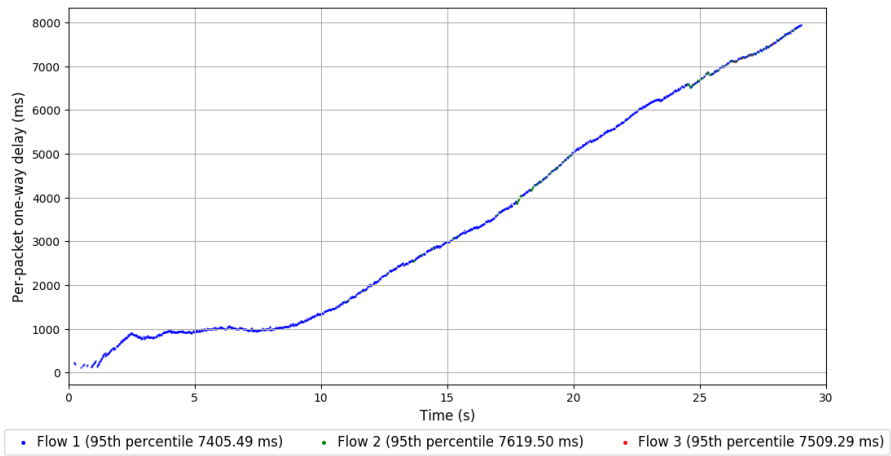
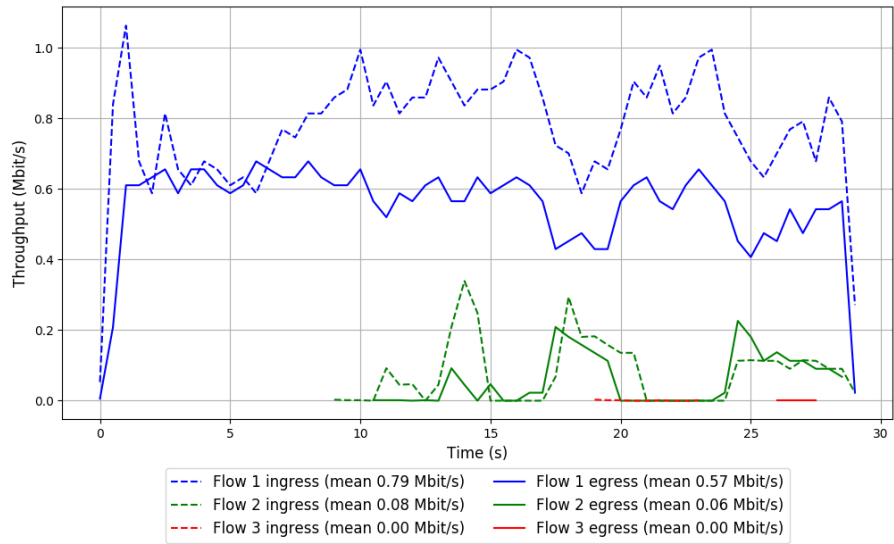


Run 1: Statistics of QUIC Cubic

Start at: 2017-12-20 18:08:52  
End at: 2017-12-20 18:09:22  
Local clock offset: -0.03 ms  
Remote clock offset: 16.226 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7438.818 ms
Loss rate: 28.97%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 7405.486 ms
Loss rate: 28.84%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 7619.500 ms
Loss rate: 30.85%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7509.290 ms
Loss rate: 33.33%
```

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

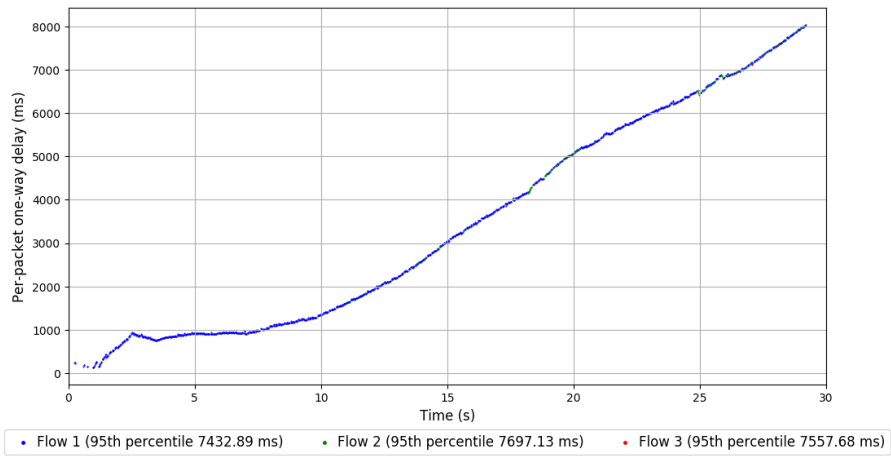
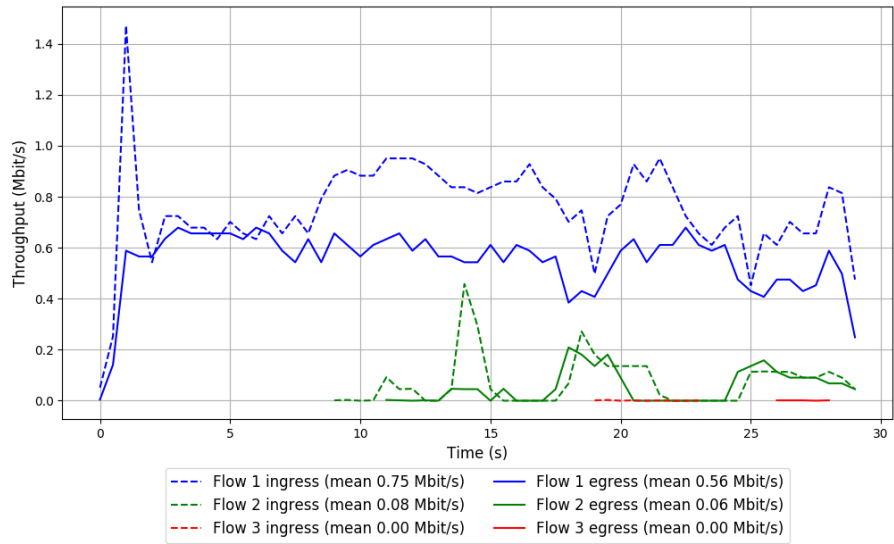


Run 2: Statistics of QUIC Cubic

Start at: 2017-12-20 18:27:41  
End at: 2017-12-20 18:28:11  
Local clock offset: -0.044 ms  
Remote clock offset: 11.091 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 7466.808 ms
Loss rate: 27.03%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 7432.894 ms
Loss rate: 26.61%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 7697.131 ms
Loss rate: 33.21%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7557.677 ms
Loss rate: 33.33%
```

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



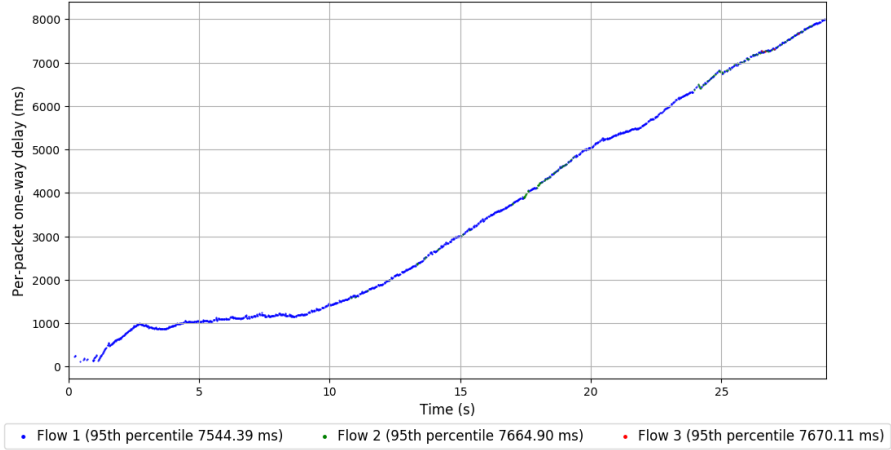
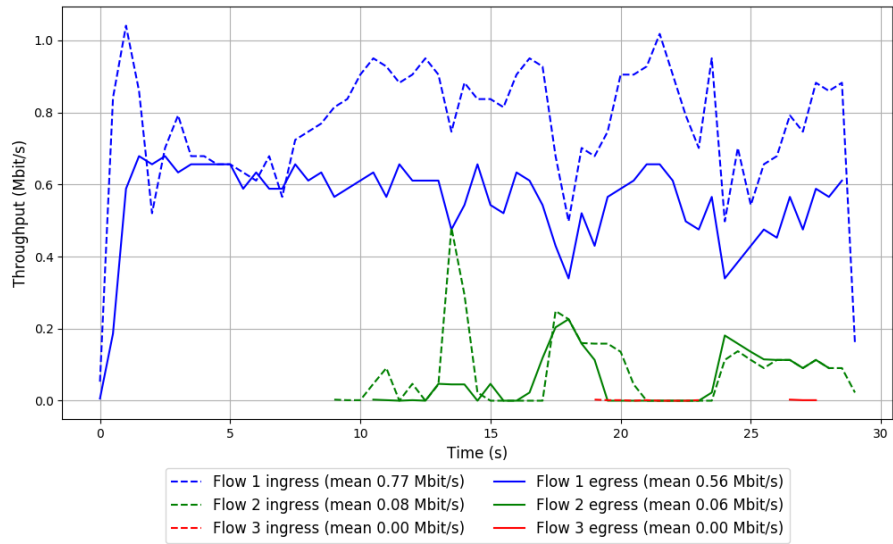
Run 3: Statistics of QUIC Cubic

Start at: 2017-12-20 18:46:29  
End at: 2017-12-20 18:46:59  
Local clock offset: -0.016 ms  
Remote clock offset: 16.125 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7571.968 ms
Loss rate: 28.85%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 7544.390 ms
Loss rate: 28.51%
-- Flow 2:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 7664.896 ms
Loss rate: 33.43%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 7670.112 ms
Loss rate: 33.33%
```



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

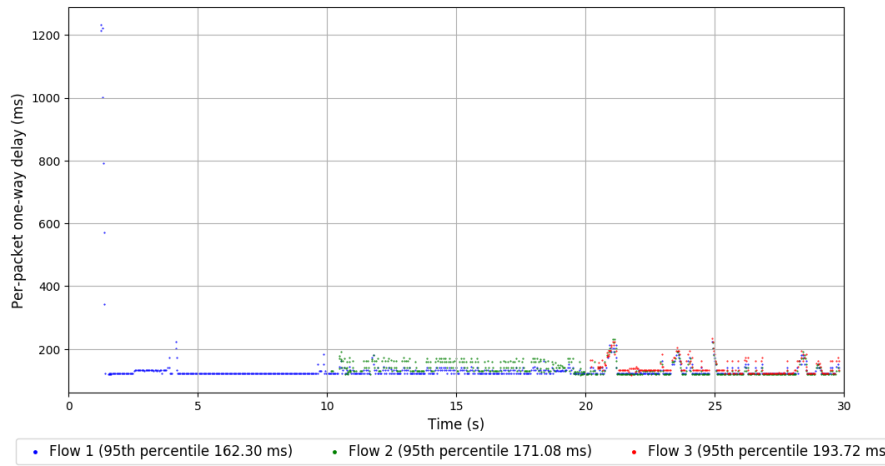
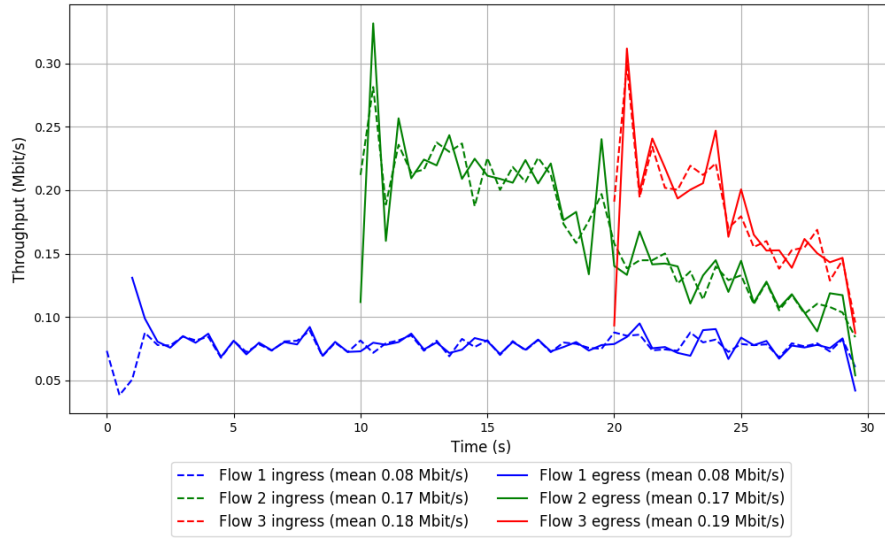


Run 1: Statistics of SCReAM

Start at: 2017-12-20 17:56:18  
End at: 2017-12-20 17:56:48  
Local clock offset: -0.037 ms  
Remote clock offset: 16.645 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 178.820 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 162.301 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 171.079 ms
Loss rate: 0.77%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 193.724 ms
Loss rate: 1.42%
```

# Run 1: Report of SCReAM — Data Link

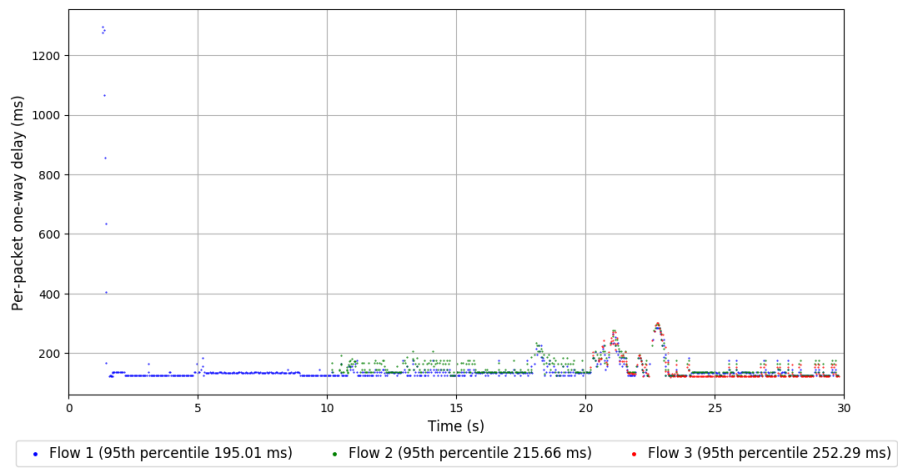
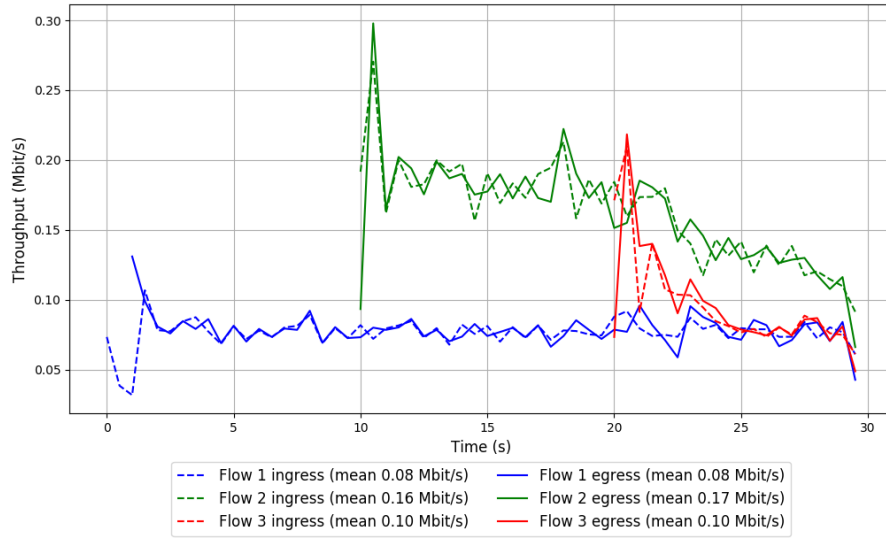


Run 2: Statistics of SCReAM

Start at: 2017-12-20 18:15:07  
End at: 2017-12-20 18:15:37  
Local clock offset: -0.043 ms  
Remote clock offset: 11.391 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 224.931 ms
Loss rate: 0.95%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 195.010 ms
Loss rate: 0.80%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 215.662 ms
Loss rate: 0.87%
-- Flow 3:
Average throughput: 0.10 Mbit/s
95th percentile per-packet one-way delay: 252.295 ms
Loss rate: 1.56%
```

## Run 2: Report of SCReAM — Data Link



Run 3: Statistics of SCReAM

Start at: 2017-12-20 18:33:55  
End at: 2017-12-20 18:34:25  
Local clock offset: -0.028 ms  
Remote clock offset: 12.496 ms

# Below is generated by plot.py at 2017-12-20 19:45:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.25 Mbit/s

95th percentile per-packet one-way delay: 217.432 ms

Loss rate: 1.03%

-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 198.259 ms

Loss rate: 0.80%

-- Flow 2:

Average throughput: 0.18 Mbit/s

95th percentile per-packet one-way delay: 219.132 ms

Loss rate: 0.98%

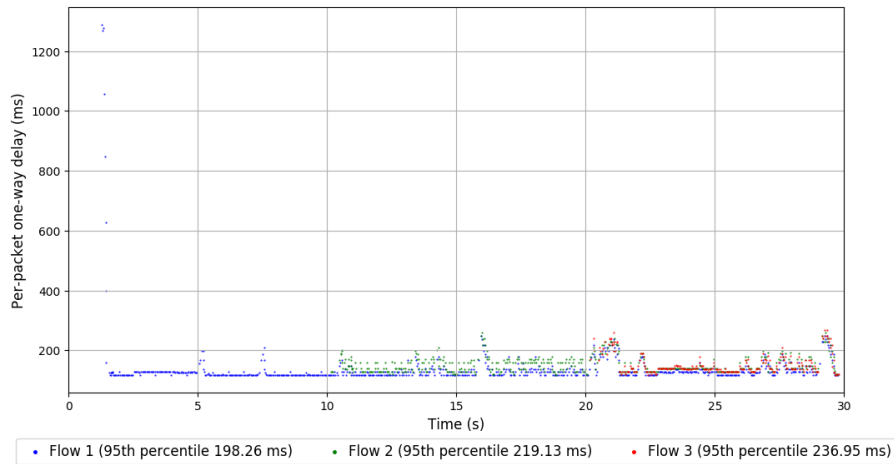
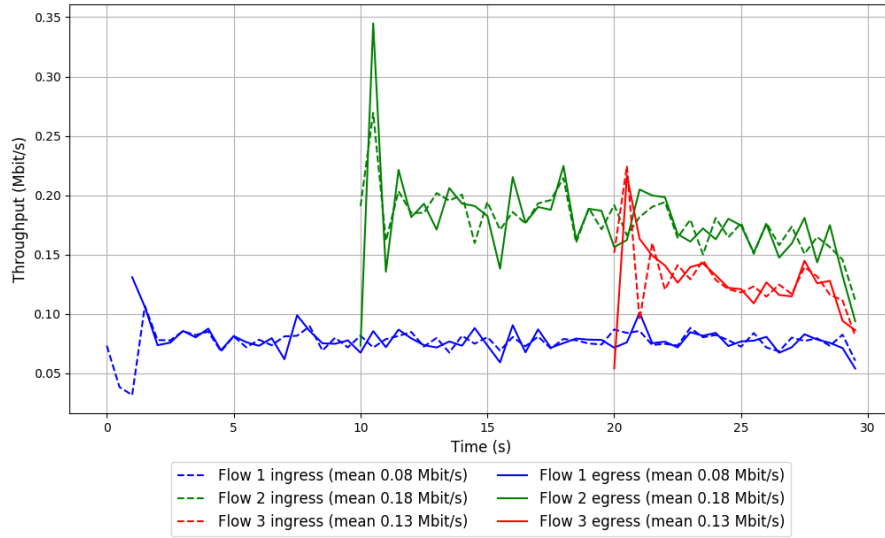
-- Flow 3:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 236.949 ms

Loss rate: 1.56%

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



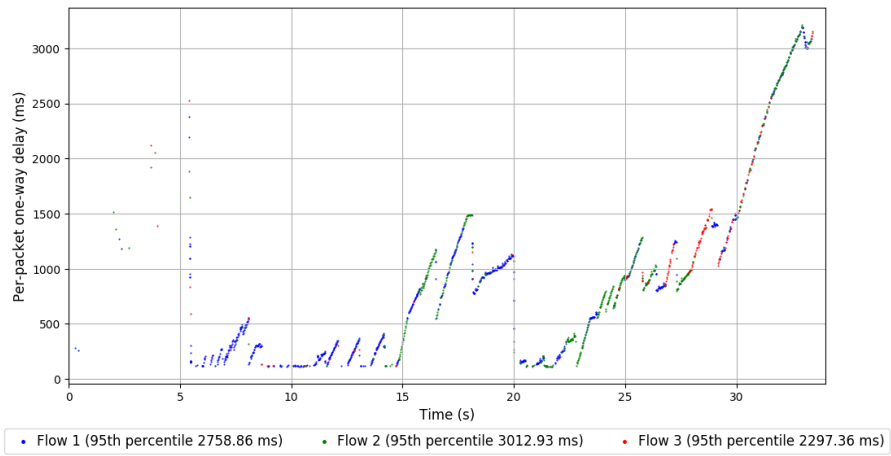
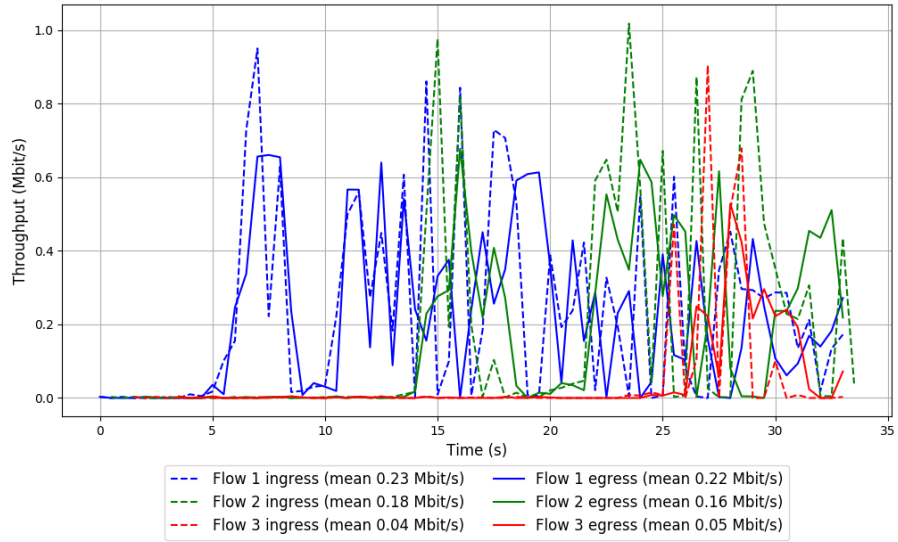
Run 1: Statistics of WebRTC media

Start at: 2017-12-20 17:55:04  
End at: 2017-12-20 17:55:34  
Local clock offset: -0.044 ms  
Remote clock offset: 16.567 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 2893.319 ms
Loss rate: 8.18%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 2758.862 ms
Loss rate: 6.79%
-- Flow 2:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 3012.926 ms
Loss rate: 11.67%
-- Flow 3:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 2297.358 ms
Loss rate: 1.38%
```



# Run 1: Report of WebRTC media — Data Link

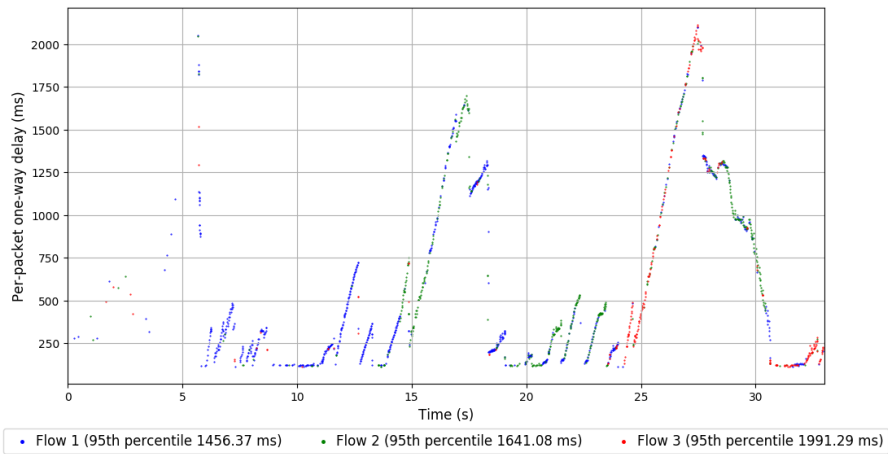
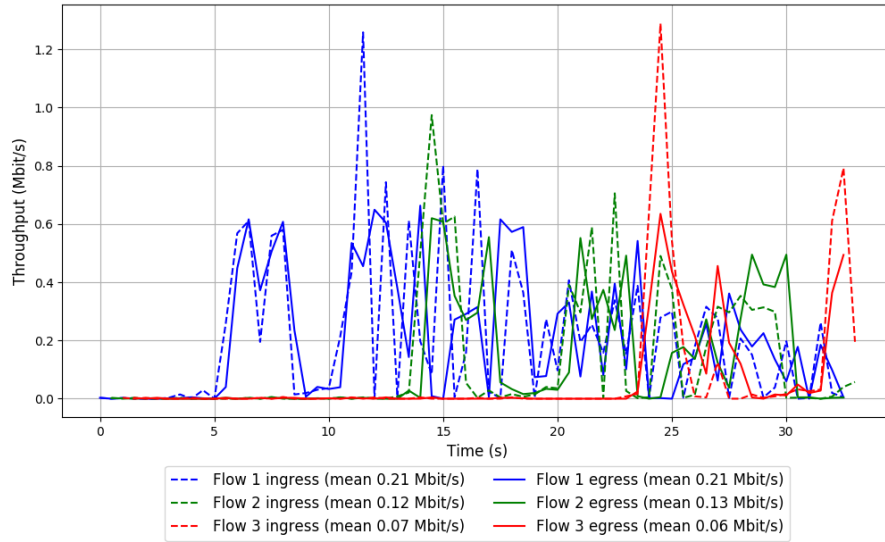


Run 2: Statistics of WebRTC media

Start at: 2017-12-20 18:13:52  
End at: 2017-12-20 18:14:22  
Local clock offset: -0.027 ms  
Remote clock offset: 16.683 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 1630.862 ms
Loss rate: 3.23%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 1456.374 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 1641.084 ms
Loss rate: 1.22%
-- Flow 3:
Average throughput: 0.06 Mbit/s
95th percentile per-packet one-way delay: 1991.285 ms
Loss rate: 16.38%
```

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2017-12-20 18:32:40

End at: 2017-12-20 18:33:10

Local clock offset: -0.102 ms

Remote clock offset: 17.75 ms

# Below is generated by plot.py at 2017-12-20 19:45:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.41 Mbit/s

95th percentile per-packet one-way delay: 1799.641 ms

Loss rate: 1.77%

-- Flow 1:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 1669.800 ms

Loss rate: 0.82%

-- Flow 2:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 1612.902 ms

Loss rate: 3.39%

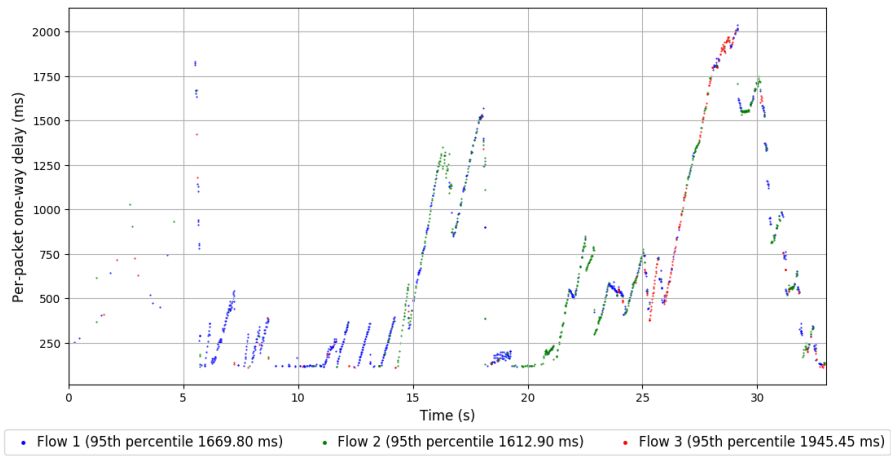
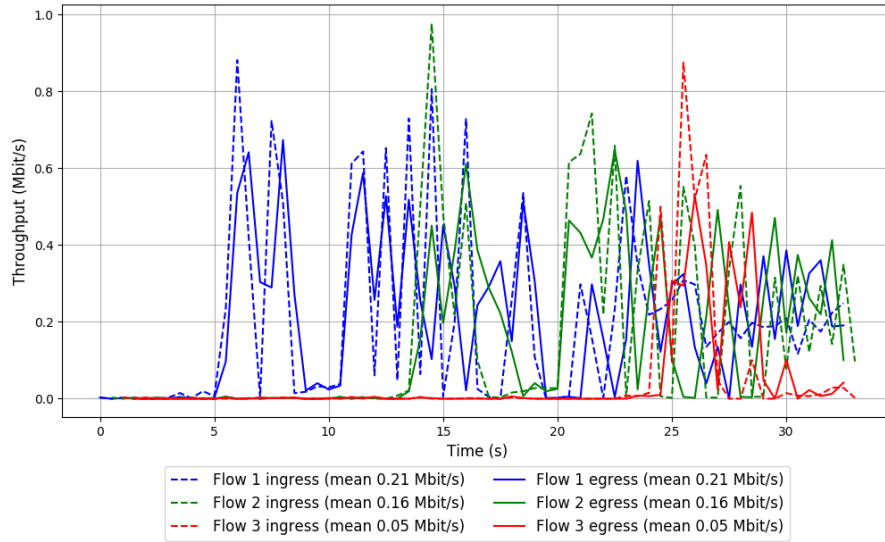
-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 1945.447 ms

Loss rate: 0.55%

### Run 3: Report of WebRTC media — Data Link

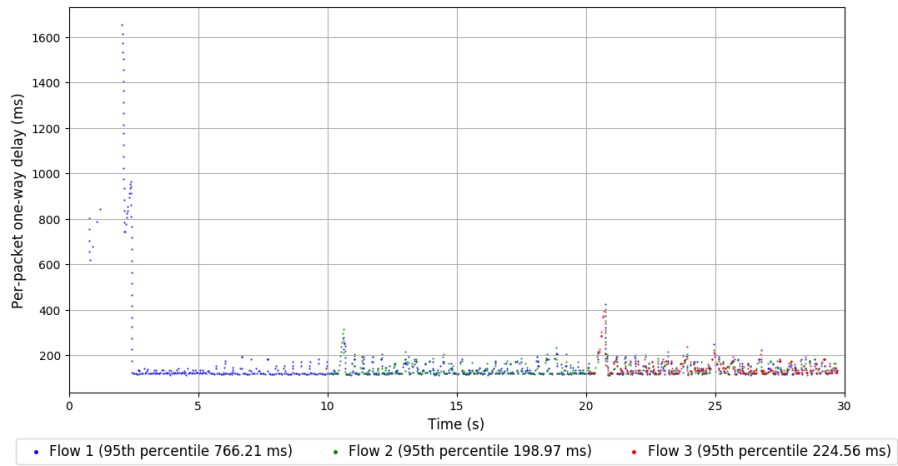
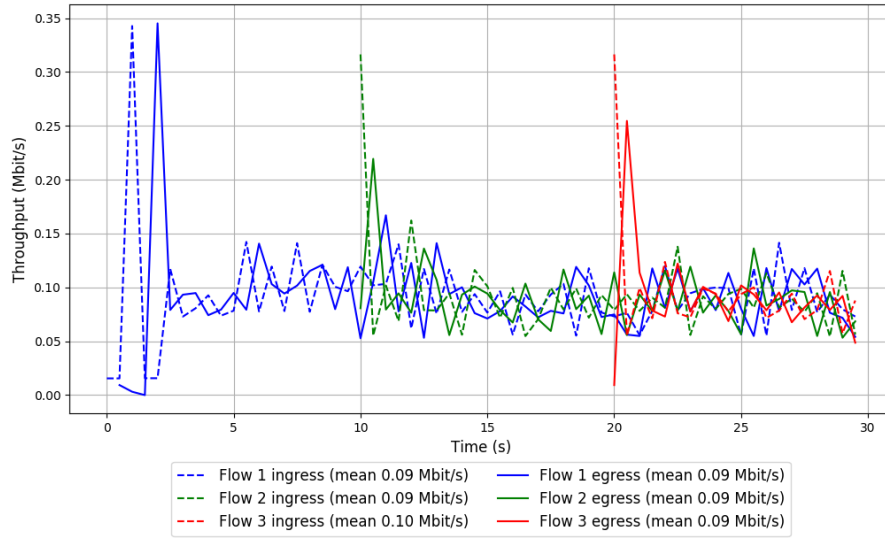


Run 1: Statistics of Sprout

Start at: 2017-12-20 18:01:17  
End at: 2017-12-20 18:01:47  
Local clock offset: -0.037 ms  
Remote clock offset: 15.719 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 275.688 ms
Loss rate: 2.88%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 766.213 ms
Loss rate: 1.66%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 198.967 ms
Loss rate: 3.18%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 224.556 ms
Loss rate: 5.74%
```

# Run 1: Report of Sprout — Data Link



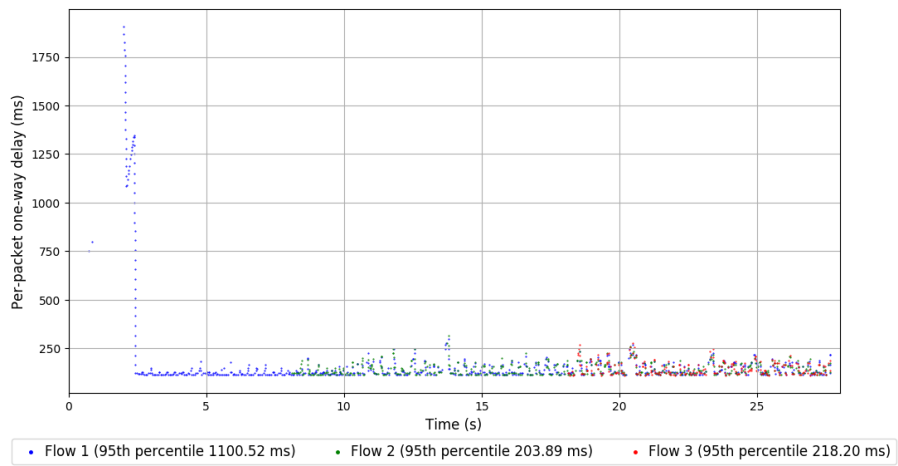
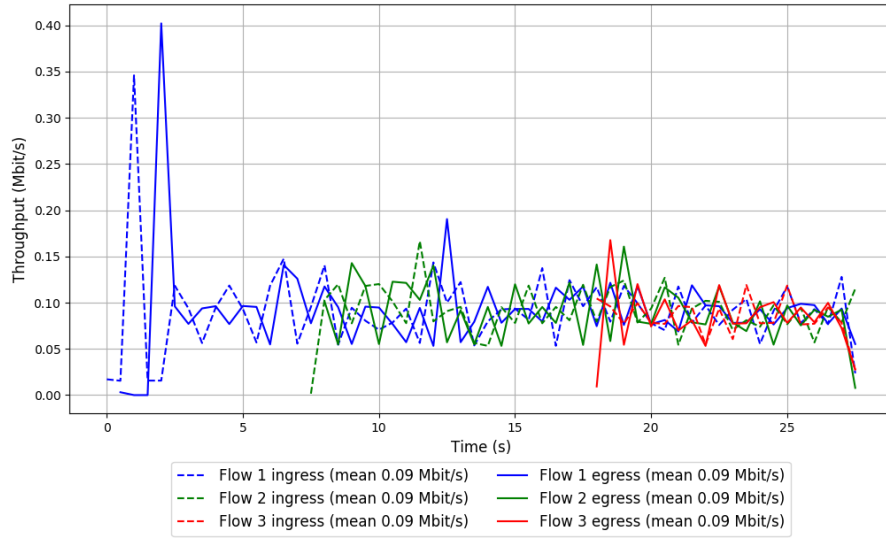
Run 2: Statistics of Sprout

Start at: 2017-12-20 18:20:06  
End at: 2017-12-20 18:20:36  
Local clock offset: -0.115 ms  
Remote clock offset: 17.967 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 246.579 ms
Loss rate: 1.54%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 1100.516 ms
Loss rate: 0.46%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 203.886 ms
Loss rate: 3.03%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 218.203 ms
Loss rate: 1.52%
```



## Run 2: Report of Sprout — Data Link

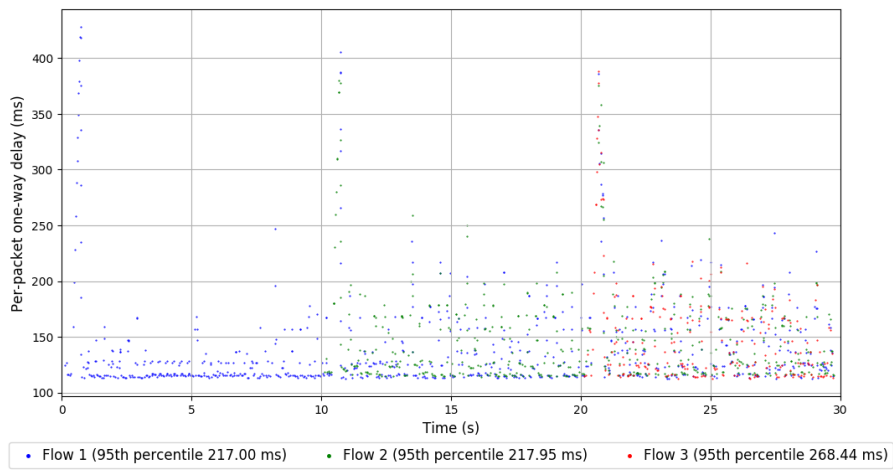
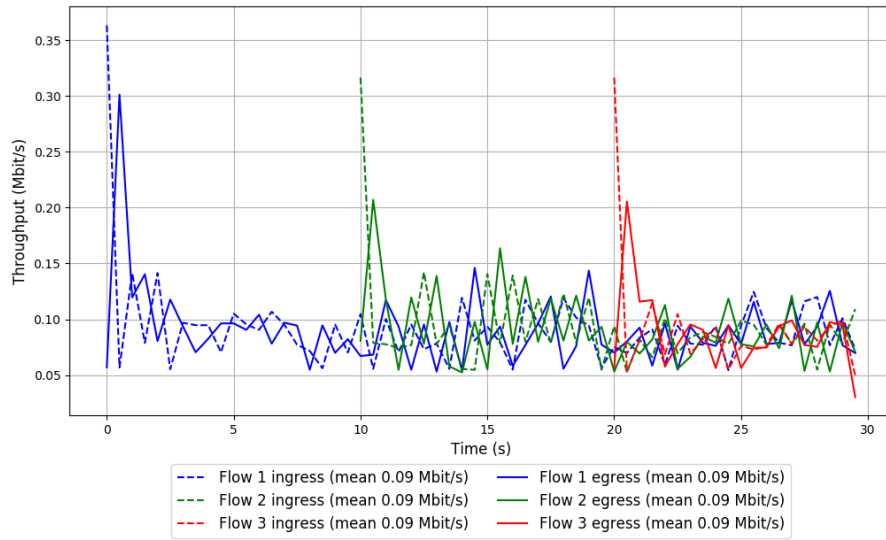


Run 3: Statistics of Sprout

Start at: 2017-12-20 18:38:54  
End at: 2017-12-20 18:39:24  
Local clock offset: -0.042 ms  
Remote clock offset: 16.525 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 217.953 ms
Loss rate: 2.54%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 217.003 ms
Loss rate: 1.17%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 217.953 ms
Loss rate: 2.83%
-- Flow 3:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 268.445 ms
Loss rate: 6.01%
```

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

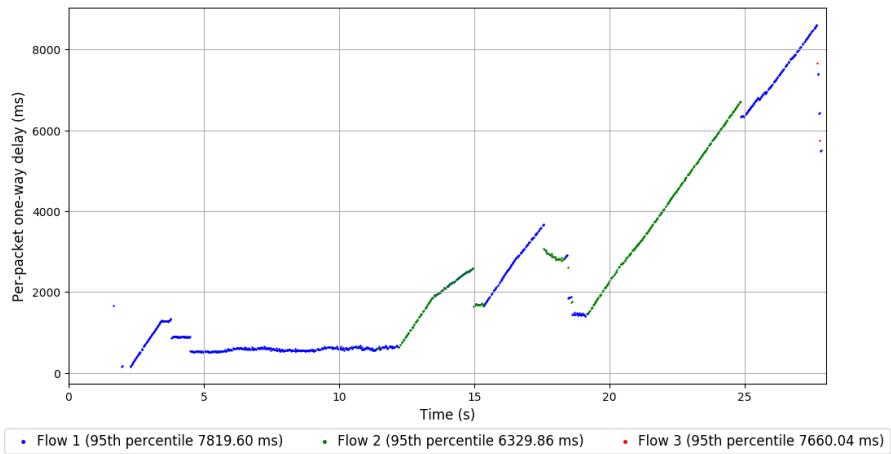
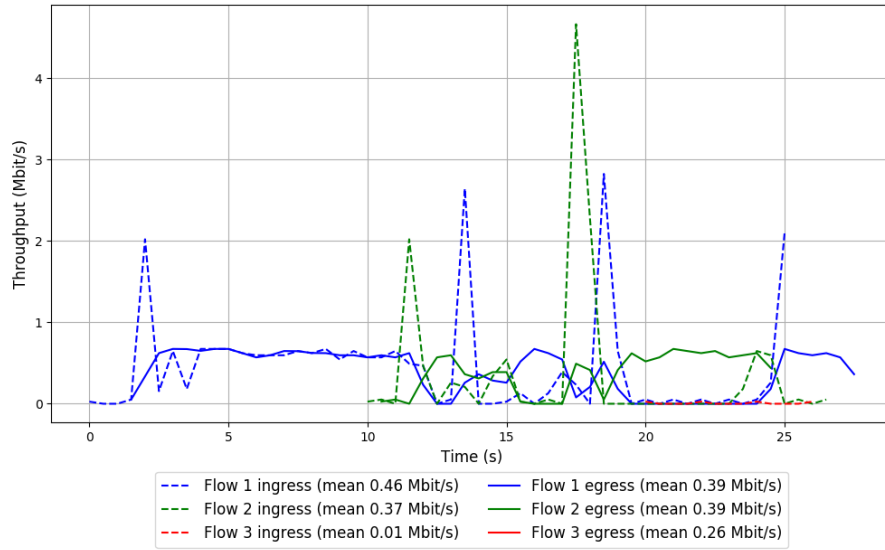


Run 1: Statistics of TaoVA-100x

Start at: 2017-12-20 18:00:02  
End at: 2017-12-20 18:00:33  
Local clock offset: -0.035 ms  
Remote clock offset: 11.381 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 7440.235 ms
Loss rate: 11.41%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 7819.600 ms
Loss rate: 10.77%
-- Flow 2:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 6329.859 ms
Loss rate: 12.27%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 7660.042 ms
Loss rate: 50.00%
```

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

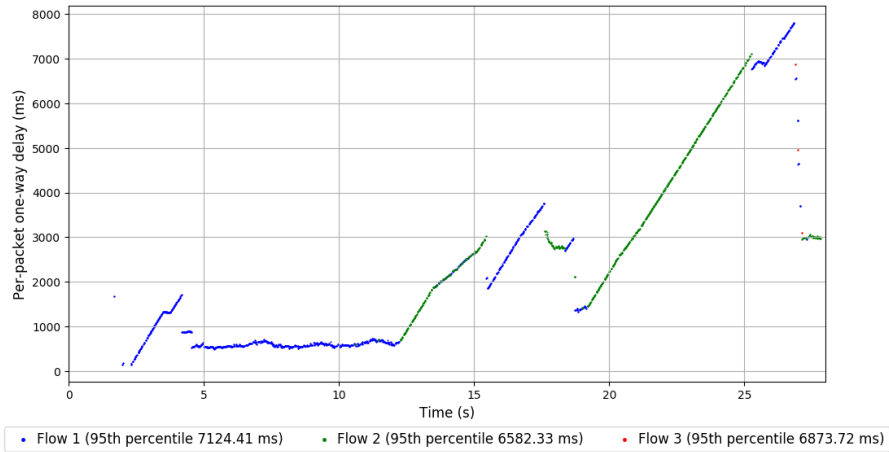
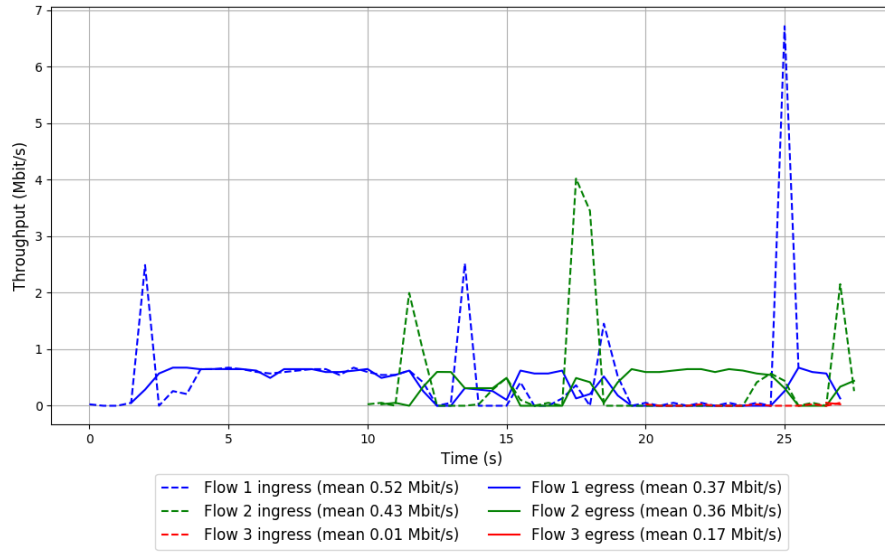


Run 2: Statistics of TaoVA-100x

Start at: 2017-12-20 18:18:52  
End at: 2017-12-20 18:19:22  
Local clock offset: -0.039 ms  
Remote clock offset: 17.084 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 6923.874 ms
Loss rate: 25.45%
-- Flow 1:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 7124.413 ms
Loss rate: 28.32%
-- Flow 2:
Average throughput: 0.36 Mbit/s
95th percentile per-packet one-way delay: 6582.333 ms
Loss rate: 20.27%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 6873.722 ms
Loss rate: 50.00%
```

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



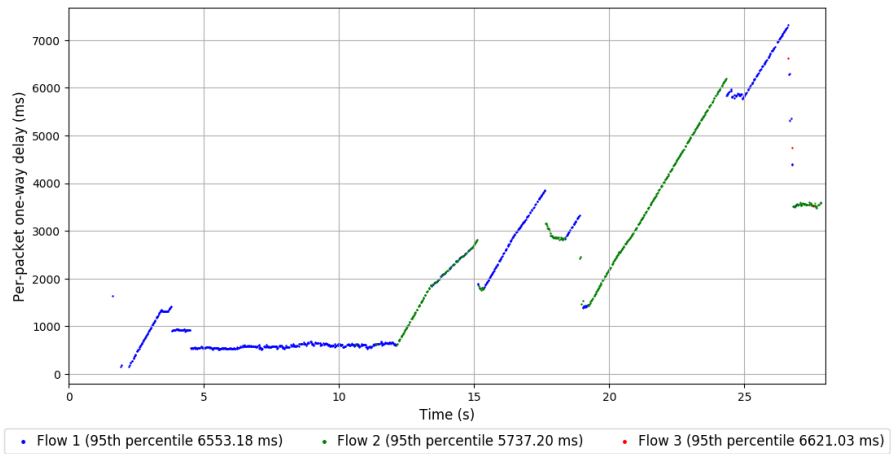
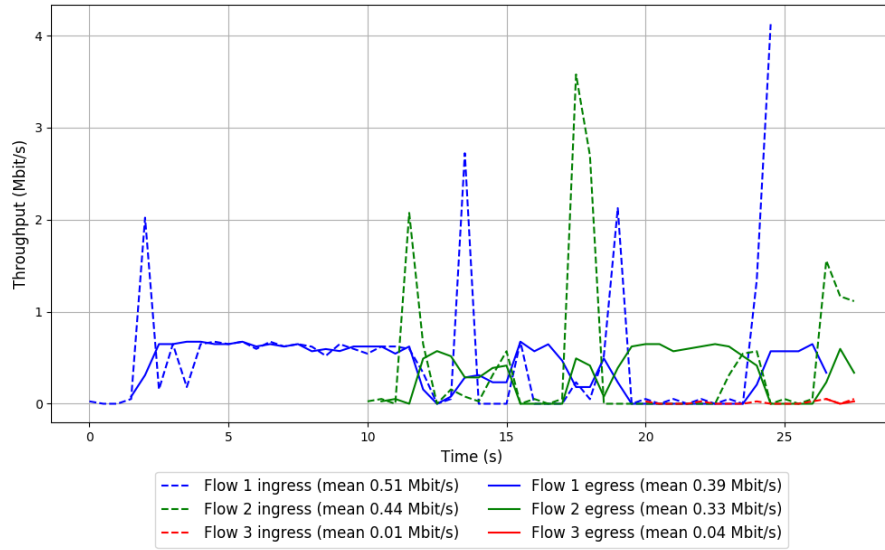
Run 3: Statistics of TaoVA-100x

Start at: 2017-12-20 18:37:39  
End at: 2017-12-20 18:38:09  
Local clock offset: -0.041 ms  
Remote clock offset: 12.498 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.60 Mbit/s
95th percentile per-packet one-way delay: 6181.601 ms
Loss rate: 23.71%
-- Flow 1:
Average throughput: 0.39 Mbit/s
95th percentile per-packet one-way delay: 6553.184 ms
Loss rate: 21.51%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 5737.204 ms
Loss rate: 26.78%
-- Flow 3:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 6621.033 ms
Loss rate: 62.50%
```



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



Run 1: Statistics of TCP Vegas

Start at: 2017-12-20 18:02:32

End at: 2017-12-20 18:03:02

Local clock offset: -0.111 ms

Remote clock offset: 17.88 ms

# Below is generated by plot.py at 2017-12-20 19:45:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.58 Mbit/s

95th percentile per-packet one-way delay: 1769.575 ms

Loss rate: 5.70%

-- Flow 1:

Average throughput: 0.40 Mbit/s

95th percentile per-packet one-way delay: 1619.573 ms

Loss rate: 3.21%

-- Flow 2:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 1759.612 ms

Loss rate: 6.68%

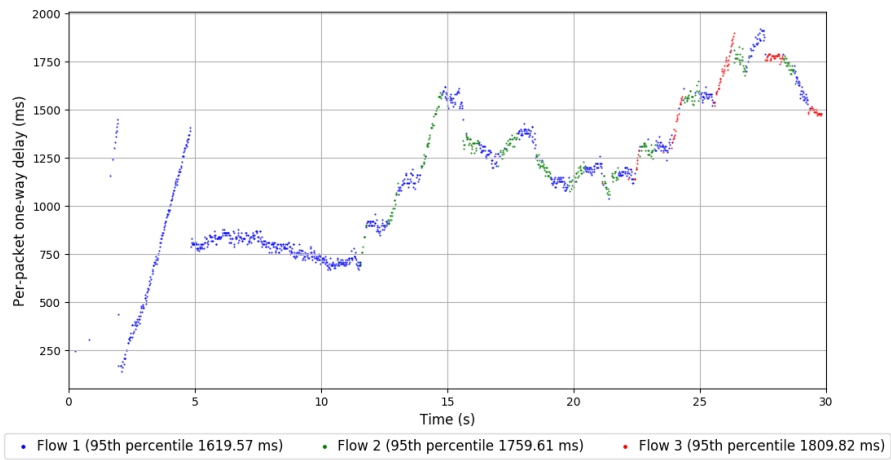
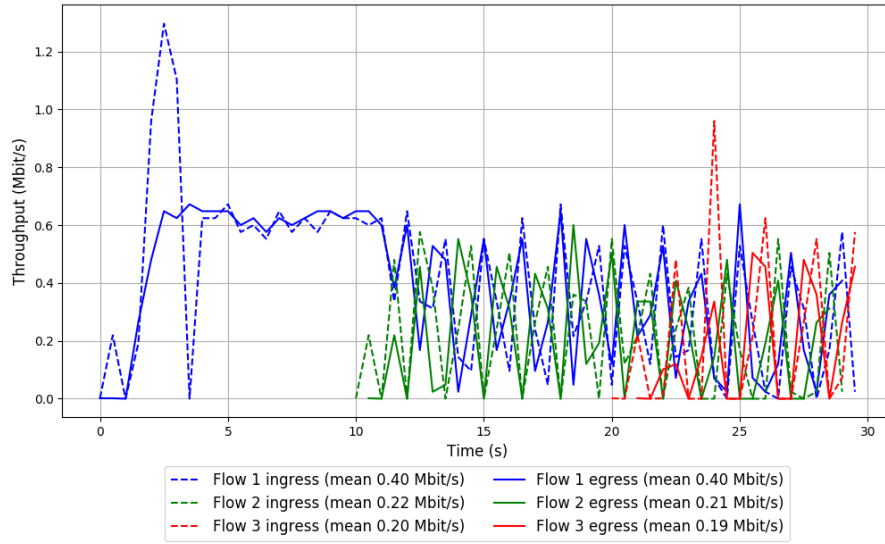
-- Flow 3:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 1809.823 ms

Loss rate: 18.75%

# Run 1: Report of TCP Vegas — Data Link

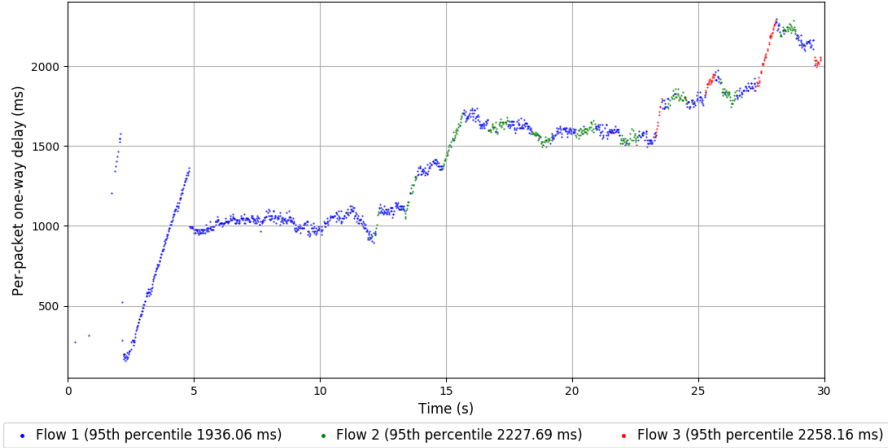
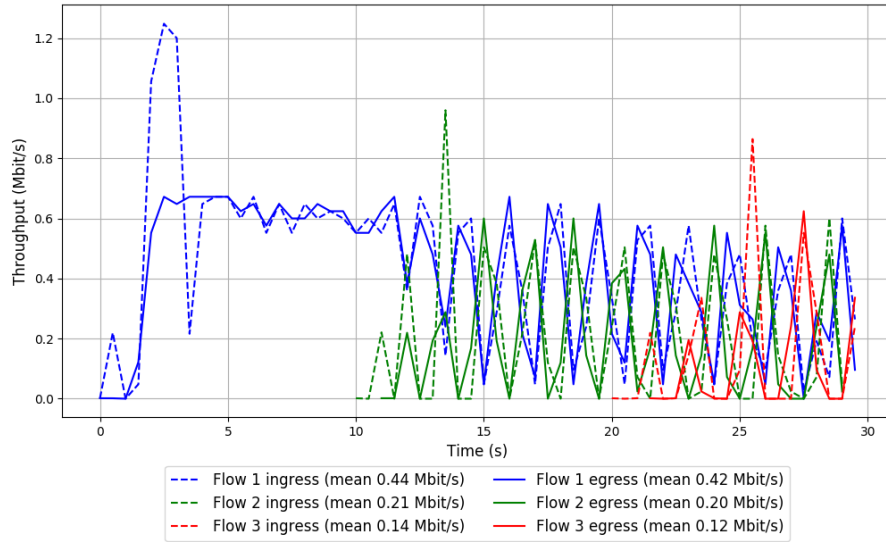


Run 2: Statistics of TCP Vegas

Start at: 2017-12-20 18:21:21  
End at: 2017-12-20 18:21:51  
Local clock offset: -0.113 ms  
Remote clock offset: 11.815 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 2155.735 ms
Loss rate: 7.03%
-- Flow 1:
Average throughput: 0.42 Mbit/s
95th percentile per-packet one-way delay: 1936.060 ms
Loss rate: 4.33%
-- Flow 2:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 2227.694 ms
Loss rate: 8.89%
-- Flow 3:
Average throughput: 0.12 Mbit/s
95th percentile per-packet one-way delay: 2258.157 ms
Loss rate: 27.11%
```

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

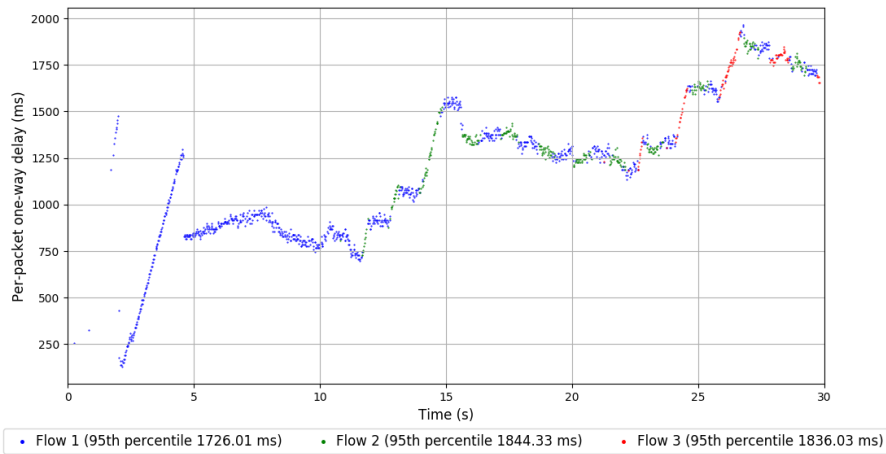
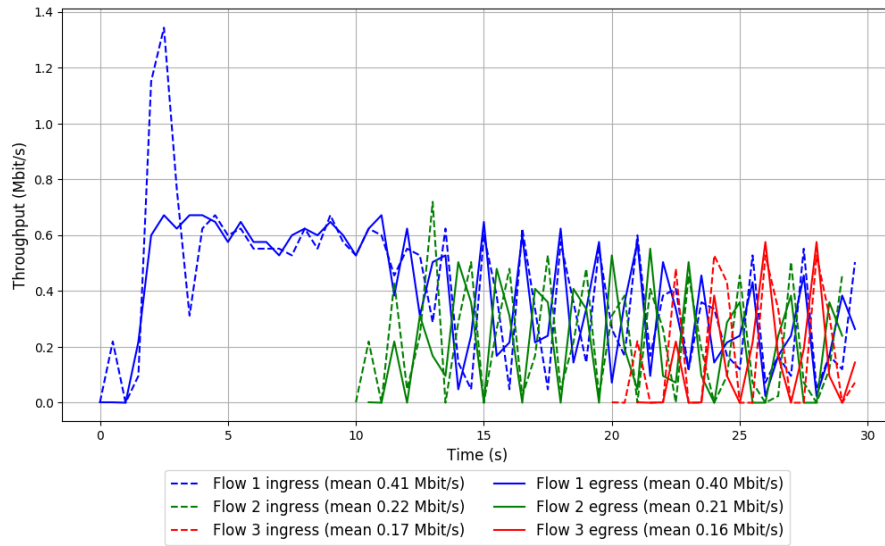


Run 3: Statistics of TCP Vegas

Start at: 2017-12-20 18:40:09  
End at: 2017-12-20 18:40:39  
Local clock offset: -0.021 ms  
Remote clock offset: 16.504 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1814.612 ms
Loss rate: 6.00%
-- Flow 1:
Average throughput: 0.40 Mbit/s
95th percentile per-packet one-way delay: 1726.008 ms
Loss rate: 3.44%
-- Flow 2:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 1844.330 ms
Loss rate: 6.78%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 1836.033 ms
Loss rate: 22.33%
```

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



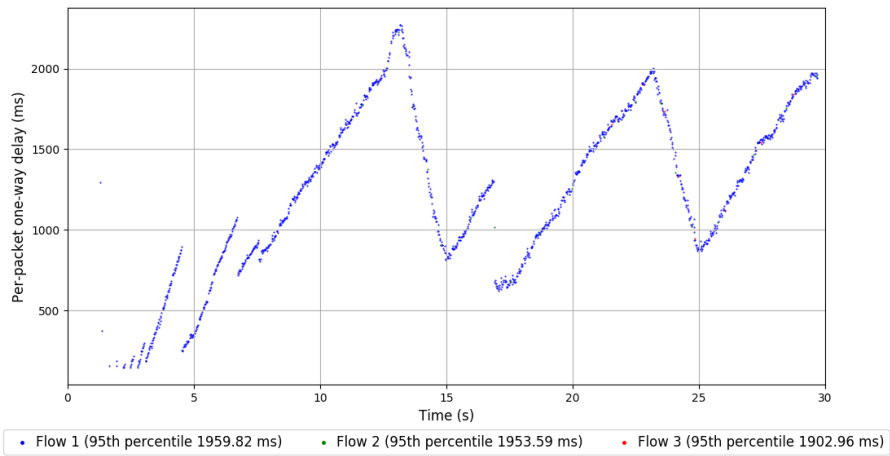
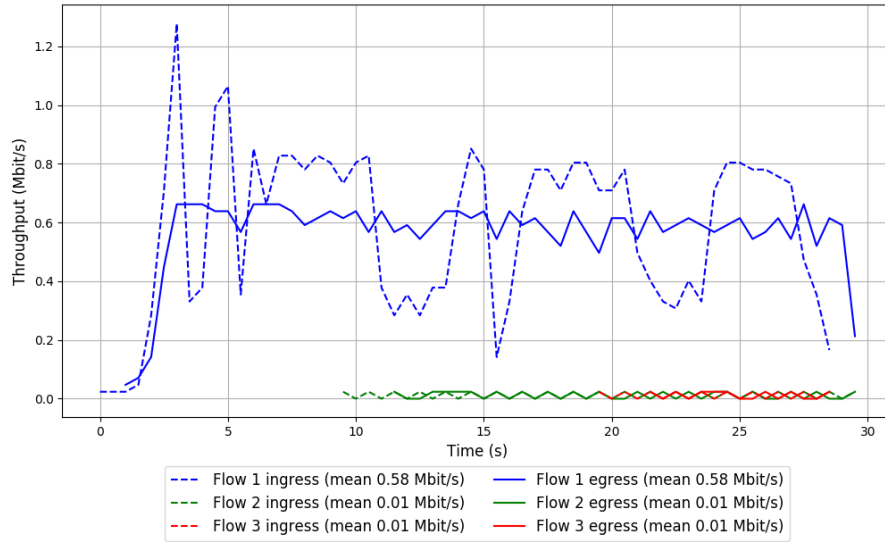
Run 1: Statistics of Verus

Start at: 2017-12-20 17:58:48  
End at: 2017-12-20 17:59:18  
Local clock offset: -0.028 ms  
Remote clock offset: 10.914 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1959.820 ms
Loss rate: 2.41%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1959.820 ms
Loss rate: 2.18%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1953.591 ms
Loss rate: 9.52%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1902.965 ms
Loss rate: 20.00%
```



### Run 1: Report of Verus — Data Link

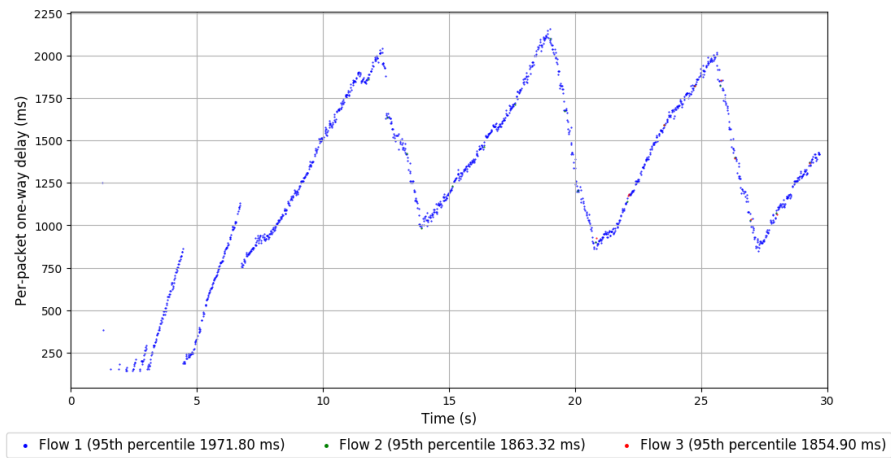
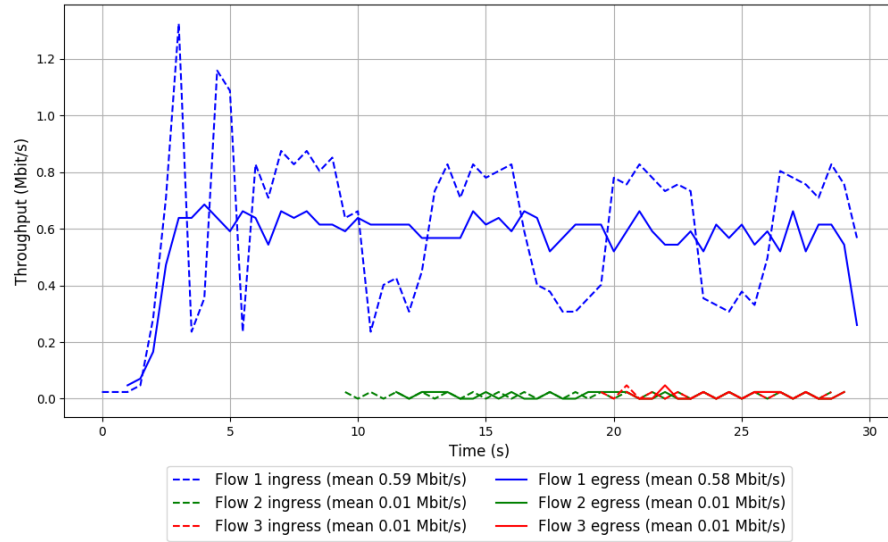


Run 2: Statistics of Verus

Start at: 2017-12-20 18:17:37  
End at: 2017-12-20 18:18:07  
Local clock offset: -0.041 ms  
Remote clock offset: 10.947 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 1971.801 ms
Loss rate: 7.06%
-- Flow 1:
Average throughput: 0.58 Mbit/s
95th percentile per-packet one-way delay: 1971.801 ms
Loss rate: 7.08%
-- Flow 2:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1863.321 ms
Loss rate: 5.00%
-- Flow 3:
Average throughput: 0.01 Mbit/s
95th percentile per-packet one-way delay: 1854.900 ms
Loss rate: 9.09%
```

## Run 2: Report of Verus — Data Link

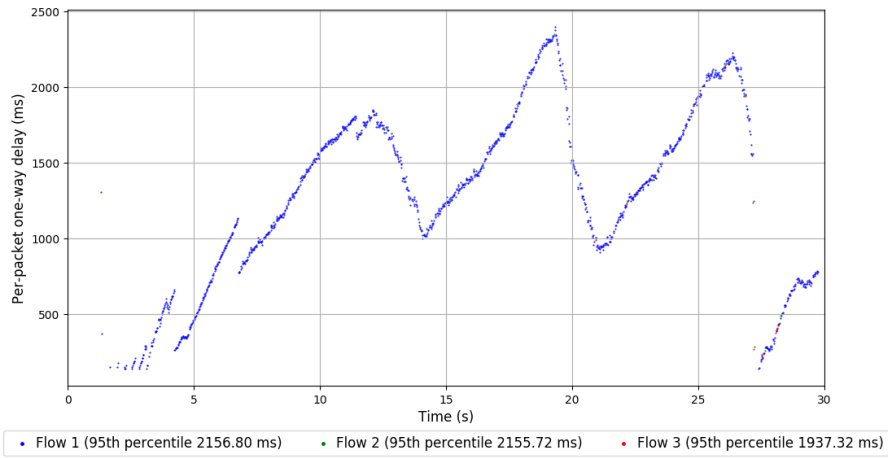
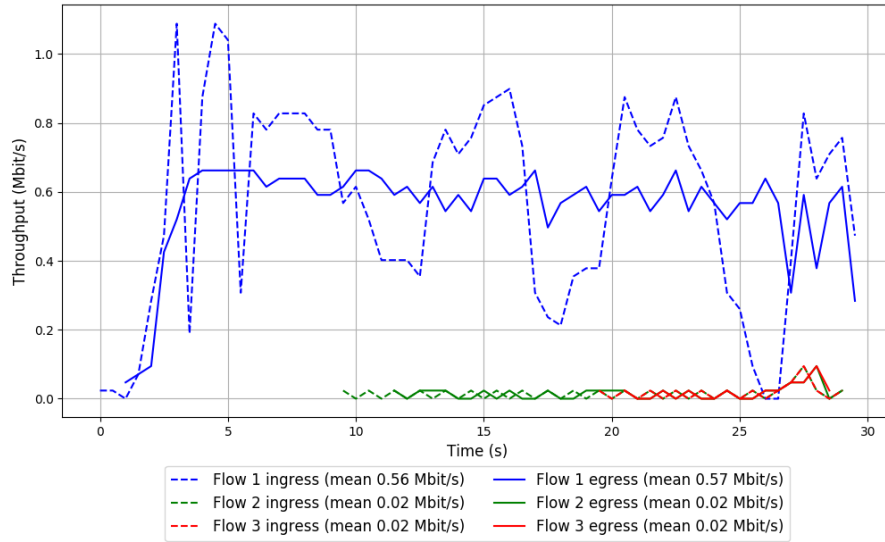


Run 3: Statistics of Verus

Start at: 2017-12-20 18:36:24  
End at: 2017-12-20 18:36:54  
Local clock offset: -0.106 ms  
Remote clock offset: 17.384 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.59 Mbit/s
95th percentile per-packet one-way delay: 2155.724 ms
Loss rate: 3.83%
-- Flow 1:
Average throughput: 0.57 Mbit/s
95th percentile per-packet one-way delay: 2156.796 ms
Loss rate: 3.80%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 2155.724 ms
Loss rate: 3.85%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1937.315 ms
Loss rate: 6.25%
```

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

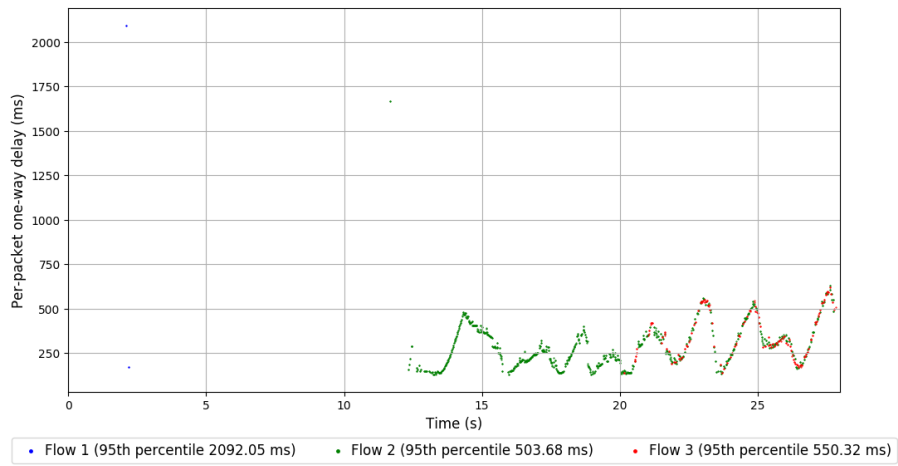
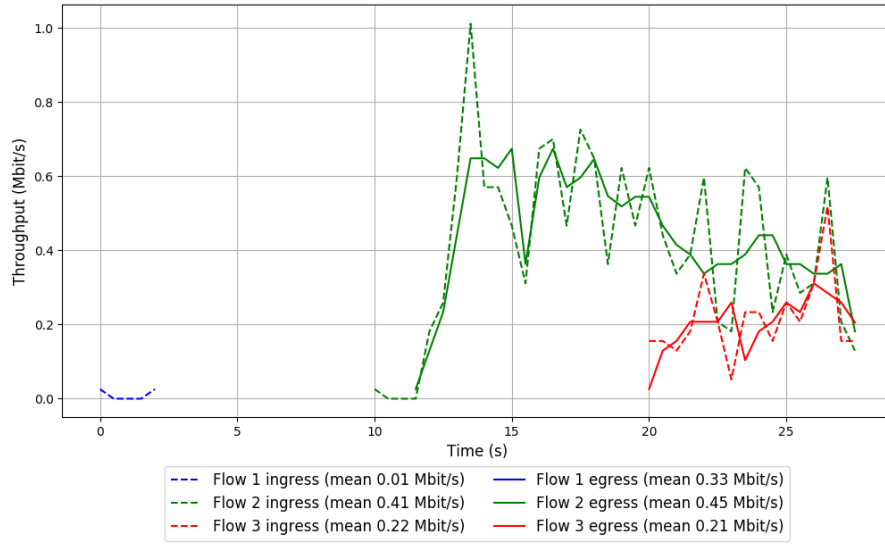


Run 1: Statistics of Copa

Start at: 2017-12-20 18:06:21  
End at: 2017-12-20 18:06:51  
Local clock offset: -0.037 ms  
Remote clock offset: 10.924 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 534.046 ms
Loss rate: 2.28%
-- Flow 1:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 2092.049 ms
Loss rate: 0.00%
-- Flow 2:
Average throughput: 0.45 Mbit/s
95th percentile per-packet one-way delay: 503.680 ms
Loss rate: 1.40%
-- Flow 3:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 550.324 ms
Loss rate: 6.07%
```

# Run 1: Report of Copa — Data Link



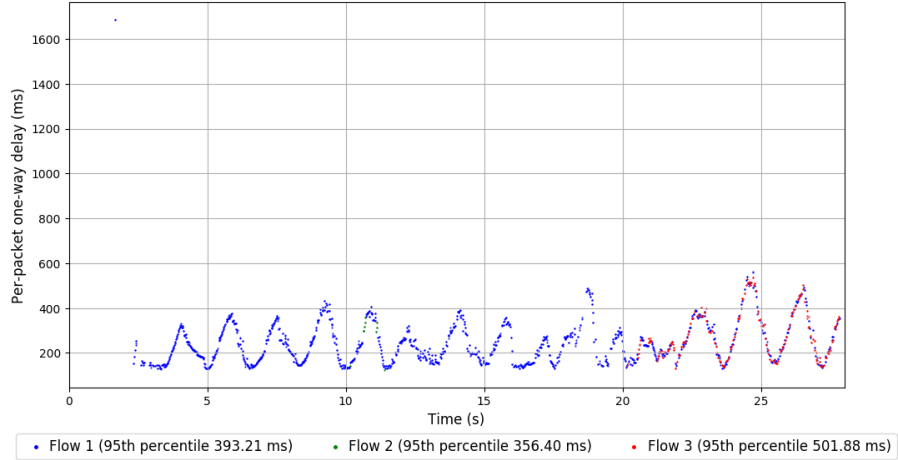
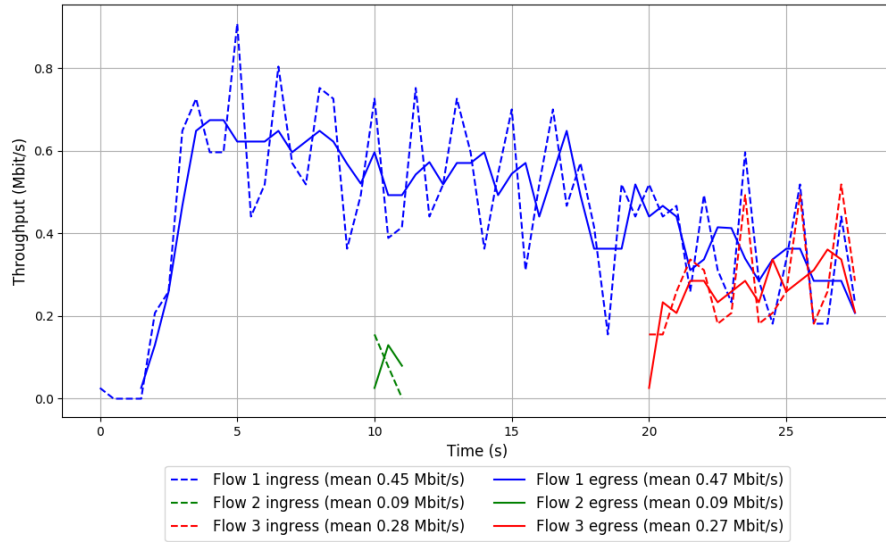
Run 2: Statistics of Copa

Start at: 2017-12-20 18:25:11  
End at: 2017-12-20 18:25:41  
Local clock offset: -0.047 ms  
Remote clock offset: 11.775 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 418.230 ms
Loss rate: 2.00%
-- Flow 1:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 393.209 ms
Loss rate: 1.03%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 356.404 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.27 Mbit/s
95th percentile per-packet one-way delay: 501.883 ms
Loss rate: 7.51%
```



## Run 2: Report of Copa — Data Link

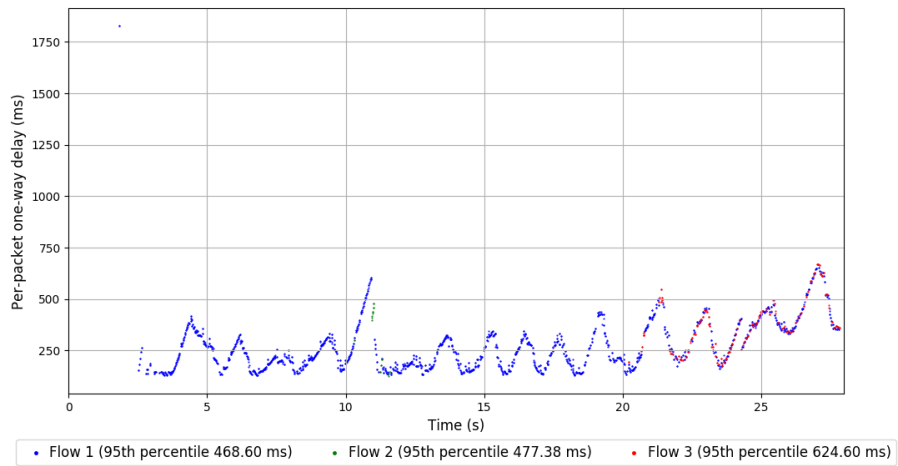
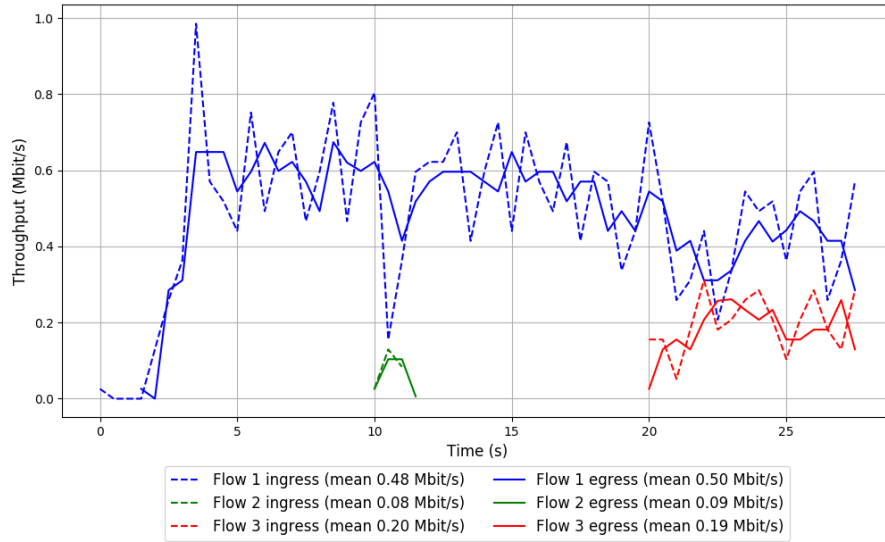


Run 3: Statistics of Copa

Start at: 2017-12-20 18:43:58  
End at: 2017-12-20 18:44:28  
Local clock offset: -0.078 ms  
Remote clock offset: 11.664 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:28
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 505.309 ms
Loss rate: 2.92%
-- Flow 1:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 468.597 ms
Loss rate: 2.22%
-- Flow 2:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 477.380 ms
Loss rate: 0.00%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 624.598 ms
Loss rate: 8.94%
```

### Run 3: Report of Copa — Data Link

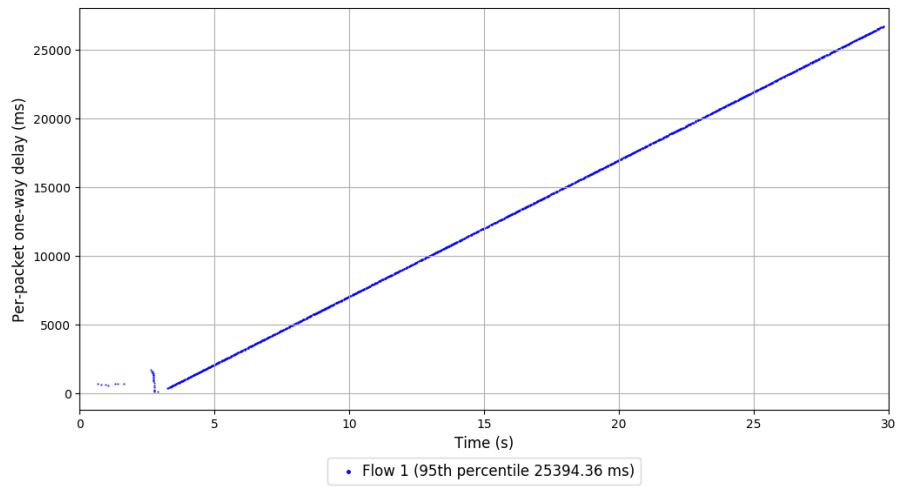
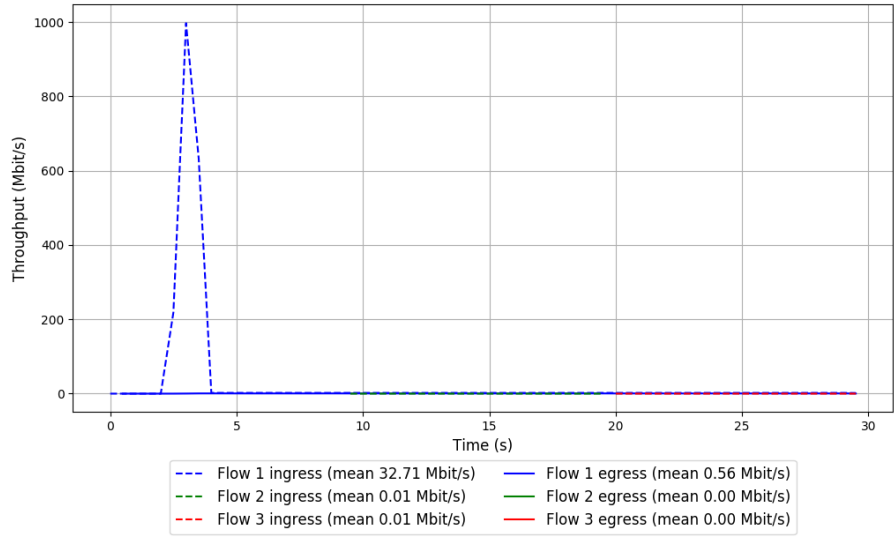


Run 1: Statistics of FillP

Start at: 2017-12-20 18:03:48  
End at: 2017-12-20 18:04:18  
Local clock offset: -0.093 ms  
Remote clock offset: 11.797 ms

# Below is generated by plot.py at 2017-12-20 19:45:30  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 25394.361 ms  
Loss rate: 98.32%  
-- Flow 1:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 25394.361 ms  
Loss rate: 98.32%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

### Run 1: Report of FillP — Data Link

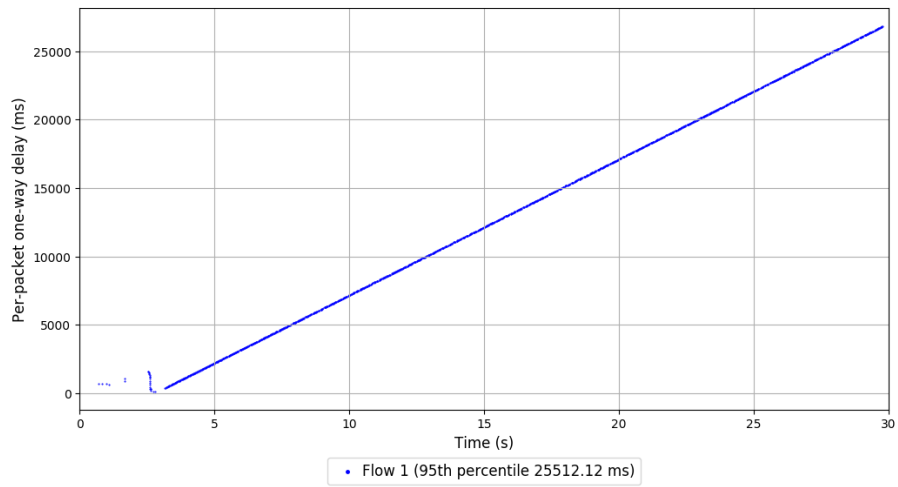
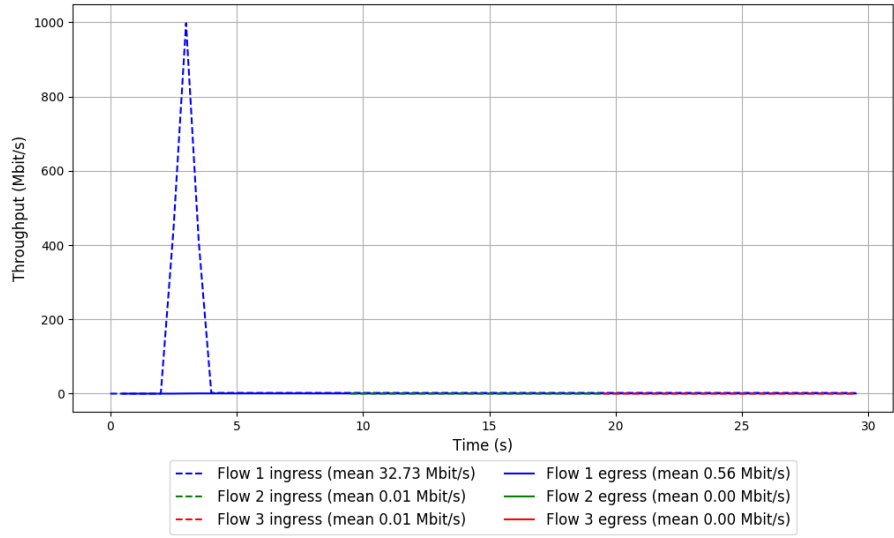


Run 2: Statistics of FillP

Start at: 2017-12-20 18:22:37  
End at: 2017-12-20 18:23:07  
Local clock offset: -0.026 ms  
Remote clock offset: 11.525 ms

# Below is generated by plot.py at 2017-12-20 19:45:31  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 25512.124 ms  
Loss rate: 98.35%  
-- Flow 1:  
Average throughput: 0.56 Mbit/s  
95th percentile per-packet one-way delay: 25512.124 ms  
Loss rate: 98.35%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

## Run 2: Report of FillP — Data Link



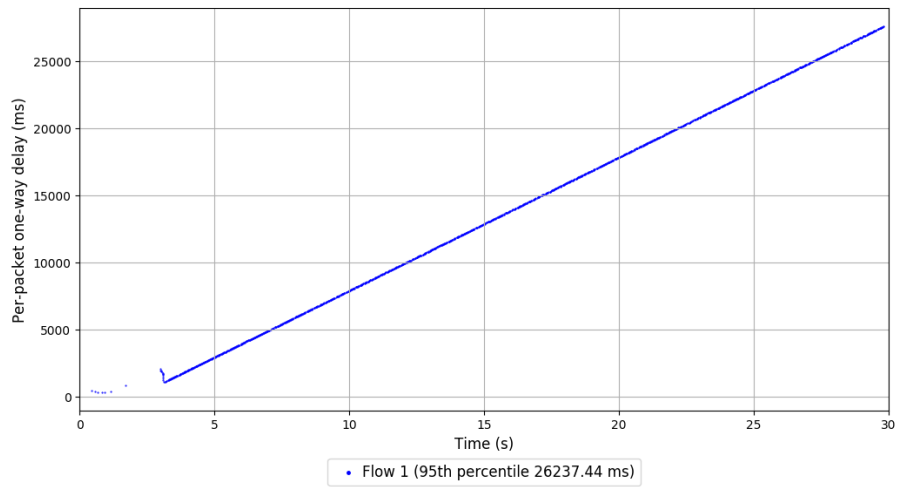
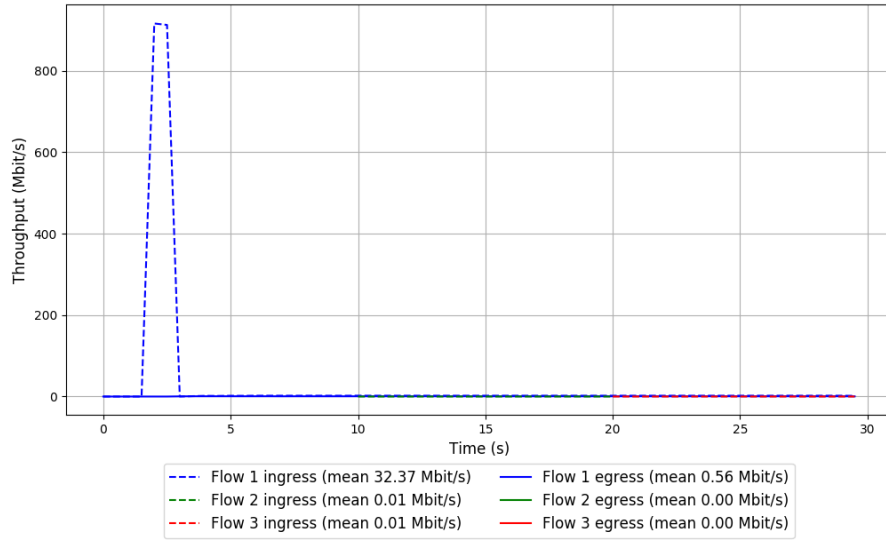
Run 3: Statistics of FillP

Start at: 2017-12-20 18:41:25  
End at: 2017-12-20 18:41:55  
Local clock offset: -0.044 ms  
Remote clock offset: 10.795 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26237.443 ms
Loss rate: 98.31%
-- Flow 1:
Average throughput: 0.56 Mbit/s
95th percentile per-packet one-way delay: 26237.443 ms
Loss rate: 98.31%
-- Flow 2:
Average throughput: 0.00 Mbit/s
-- Flow 3:
Average throughput: 0.00 Mbit/s
```



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

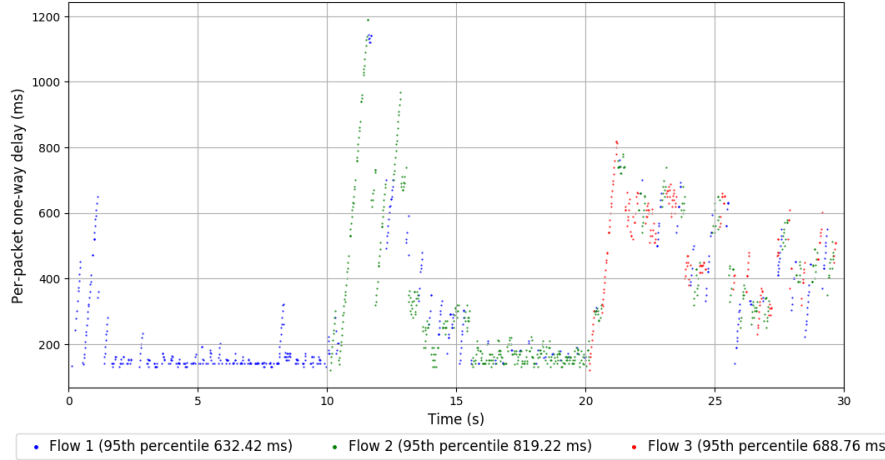
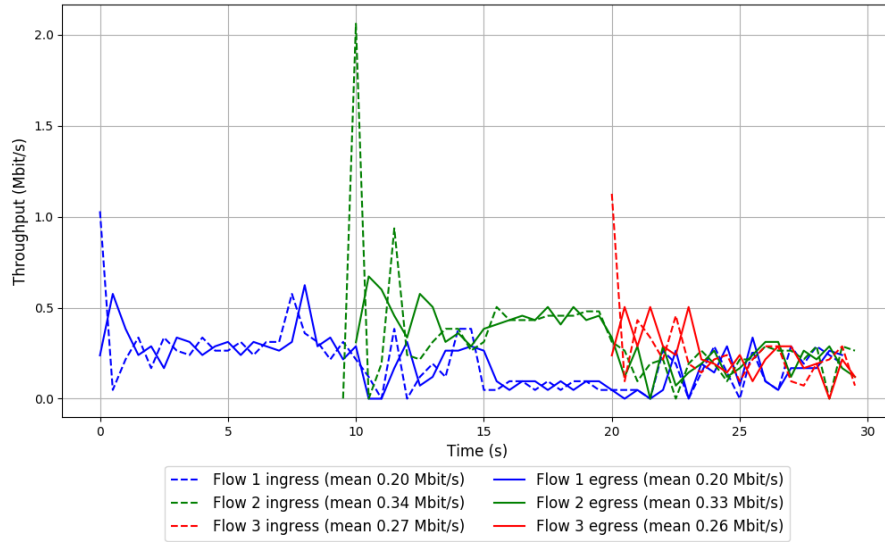


Run 1: Statistics of Indigo

Start at: 2017-12-20 17:52:33  
End at: 2017-12-20 17:53:03  
Local clock offset: -0.034 ms  
Remote clock offset: 15.545 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.50 Mbit/s
95th percentile per-packet one-way delay: 739.754 ms
Loss rate: 4.22%
-- Flow 1:
Average throughput: 0.20 Mbit/s
95th percentile per-packet one-way delay: 632.422 ms
Loss rate: 2.22%
-- Flow 2:
Average throughput: 0.33 Mbit/s
95th percentile per-packet one-way delay: 819.223 ms
Loss rate: 5.13%
-- Flow 3:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 688.761 ms
Loss rate: 6.37%
```

# Run 1: Report of Indigo — Data Link

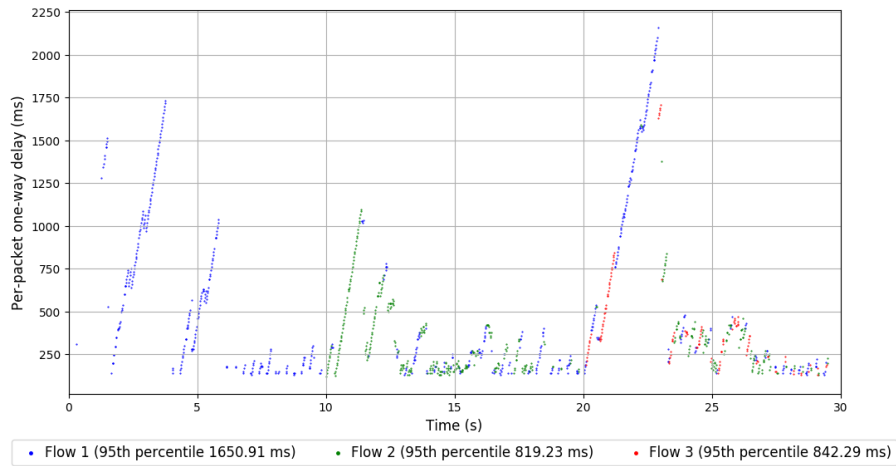
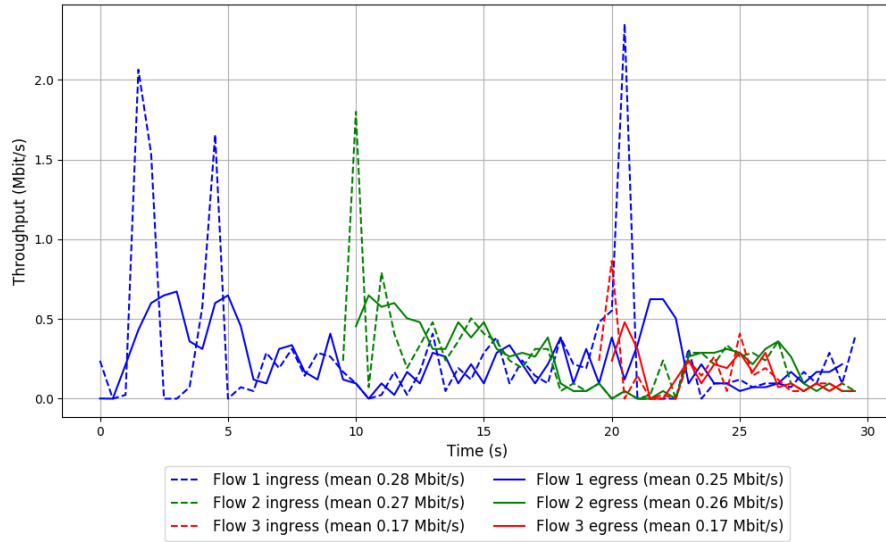


Run 2: Statistics of Indigo

Start at: 2017-12-20 18:11:22  
End at: 2017-12-20 18:11:52  
Local clock offset: -0.033 ms  
Remote clock offset: 17.693 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.47 Mbit/s
95th percentile per-packet one-way delay: 1540.485 ms
Loss rate: 9.64%
-- Flow 1:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 1650.908 ms
Loss rate: 13.87%
-- Flow 2:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 819.234 ms
Loss rate: 4.77%
-- Flow 3:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 842.286 ms
Loss rate: 3.73%
```

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2017-12-20 18:30:11  
End at: 2017-12-20 18:30:41  
Local clock offset: -0.101 ms  
Remote clock offset: 18.592 ms

```
# Below is generated by plot.py at 2017-12-20 19:45:31
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.49 Mbit/s
95th percentile per-packet one-way delay: 1387.225 ms
Loss rate: 10.69%
-- Flow 1:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 1450.804 ms
Loss rate: 13.17%
-- Flow 2:
Average throughput: 0.30 Mbit/s
95th percentile per-packet one-way delay: 1289.378 ms
Loss rate: 9.06%
-- Flow 3:
Average throughput: 0.19 Mbit/s
95th percentile per-packet one-way delay: 958.910 ms
Loss rate: 5.48%
```

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

