

## Pantheon Report

Generated at 2018-08-10 00:53:18 (UTC).

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

Repeated the test of 17 congestion control schemes 3 times.

Each test lasted for 30 seconds running 3 flows with 10-second interval between two flows.

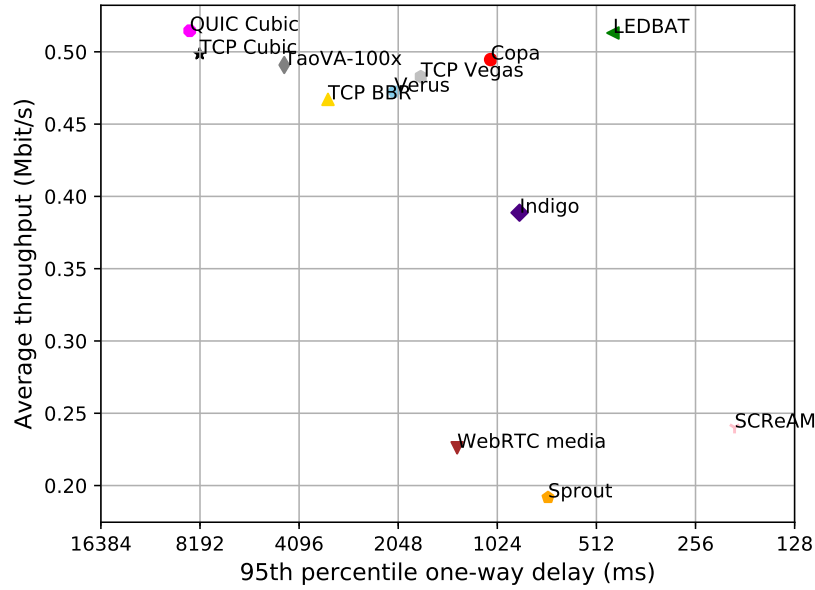
Increased UDP receive buffer to 16 MB (default) and 32 MB (max).

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

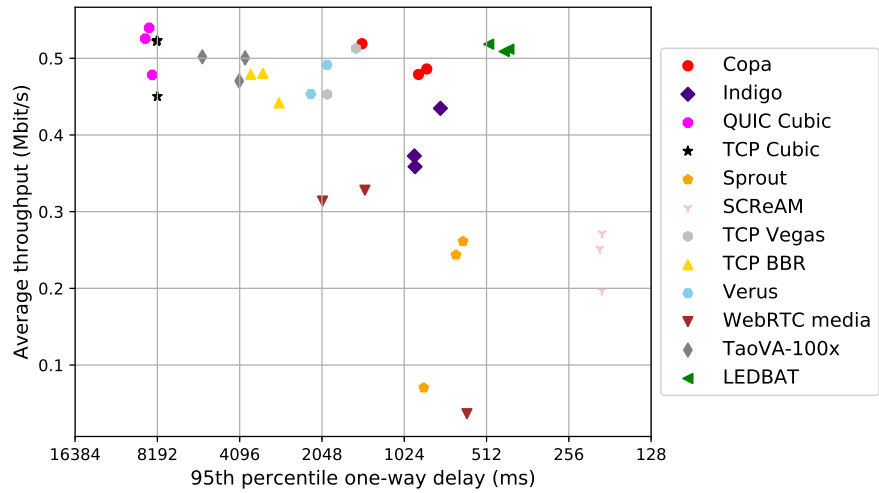
Git summary:

```
branch: master @ 7772df3413f4b07ba0096dfdd8e9d4c6dca623e3
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf90c077e64d
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ 6f038ed31259d366f9840f65b82cbe8f464b1b39
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
M receiver/src/buffer.h
M receiver/src/core.cpp
M sender/src/buffer.h
M sender/src/core.cpp
third_party/pcc-experimental @ cd43e34e3f5f5613e8acd08fab92c4eb24f974ab
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream-reproduce @ f099118d1421aa3131bf11ff1964974e1da3bdb2
M src/ScreamClient
M src/ScreamServer
third_party/sprout @ 366e35c6178b01e31d4a46ad18c74f9415f19a26
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
M src/verus.hpp
M tools/plot.py
third_party/vivace @ 2baf86211435ae071a32f96b7d8c504587f5d7f4
third_party/webrtc @ 3f0cc2a9061a41b6f9dde4735770d143a1fa2851
```

test from Colombia ppp0 to AWS Brazil 2, 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, 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	0.29	0.27	0.01	3305.74	3384.01	3109.97	4.06	6.95	53.22
Copa	3	0.30	0.23	0.15	1000.98	1108.93	1221.31	3.40	5.40	8.84
TCP Cubic	3	0.49	0.03	0.00	8222.32	6370.12	8622.63	31.59	52.84	90.93
FillP	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
FillP-Sheep	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Indigo	3	0.20	0.19	0.19	739.65	860.87	982.26	0.74	1.34	2.23
LEDBAT	3	0.22	0.34	0.22	358.75	466.33	498.44	0.12	0.65	5.25
PCC-Allegro	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCC-Expr	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
QUIC Cubic	3	0.52	0.00	0.01	8789.00	5875.74	9050.82	32.87	0.00	55.56
SCReAM	3	0.08	0.16	0.15	184.71	201.77	203.07	0.80	1.03	2.15
Sprout	3	0.09	0.10	0.11	772.92	572.14	784.77	18.89	19.55	23.85
TaoVA-100x	3	0.30	0.25	0.16	3751.69	4381.73	4474.67	7.23	10.74	41.20
TCP Vegas	2	0.29	0.22	0.20	1477.45	1777.84	1769.07	1.83	5.31	17.56
Verus	2	0.46	0.01	0.01	2106.23	2082.09	2062.60	4.21	4.55	13.34
PCC-Vivace	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WebRTC media	3	0.10	0.08	0.05	1611.37	1323.29	1179.24	19.62	19.99	23.69

Run 1: Statistics of TCP BBR

Start at: 2018-08-10 00:02:34

End at: 2018-08-10 00:03:04

Local clock offset: -3.735 ms

Remote clock offset: 7.265 ms

# Below is generated by plot.py at 2018-08-10 00:52:46

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.48 Mbit/s

95th percentile per-packet one-way delay: 3368.493 ms

Loss rate: 5.21%

-- Flow 1:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 3277.113 ms

Loss rate: 4.02%

-- Flow 2:

Average throughput: 0.27 Mbit/s

95th percentile per-packet one-way delay: 3451.847 ms

Loss rate: 5.82%

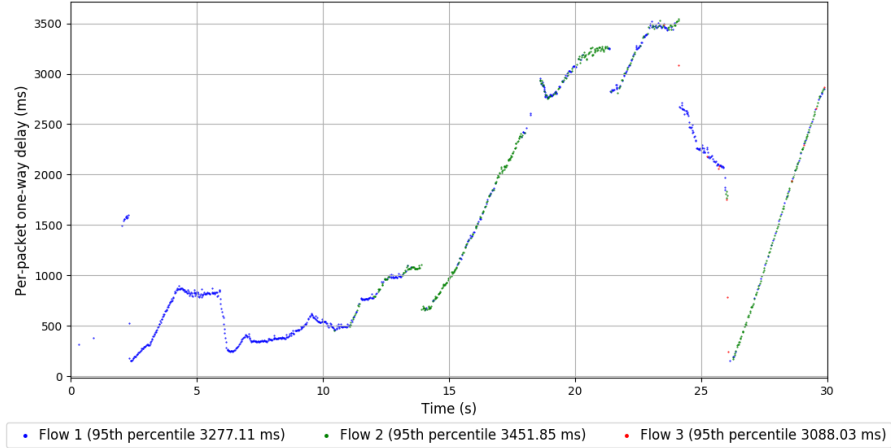
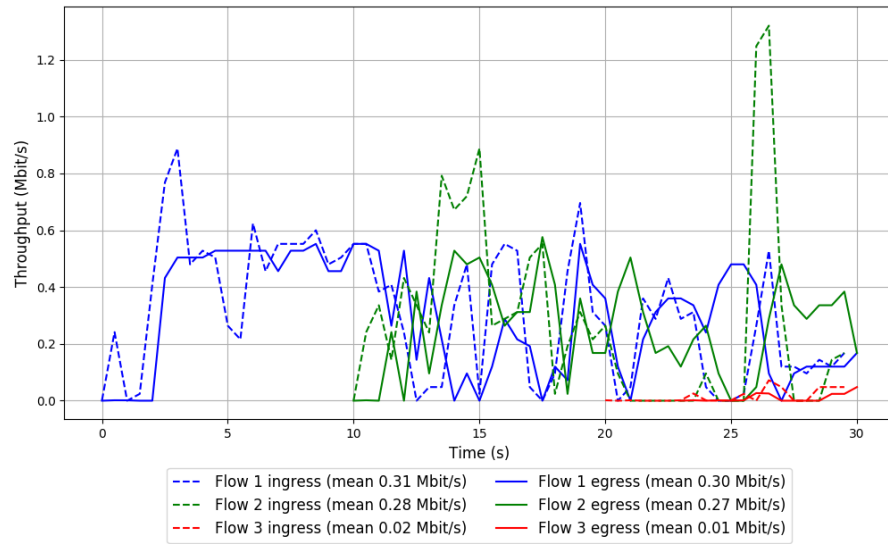
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3088.027 ms

Loss rate: 52.36%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-10 00:23:09

End at: 2018-08-10 00:23:39

Local clock offset: -2.992 ms

Remote clock offset: 2.142 ms

# Below is generated by plot.py at 2018-08-10 00:52:46

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.48 Mbit/s

95th percentile per-packet one-way delay: 3731.513 ms

Loss rate: 5.22%

-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 3711.692 ms

Loss rate: 3.97%

-- Flow 2:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 3742.292 ms

Loss rate: 5.52%

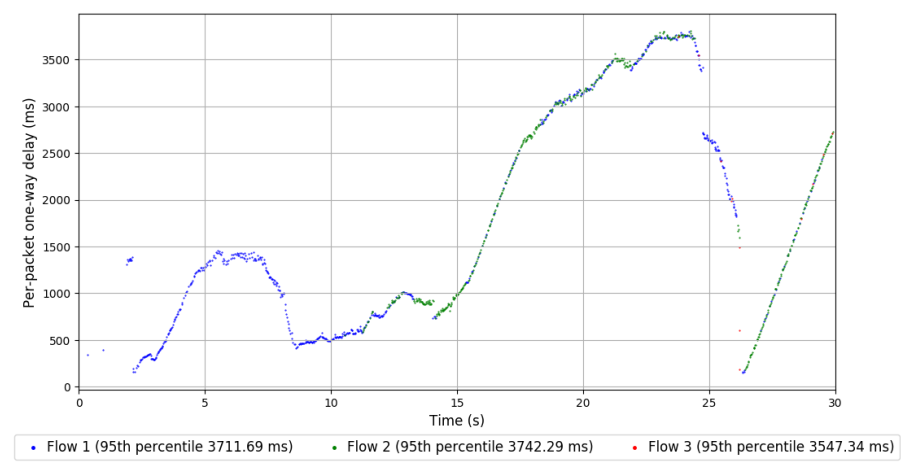
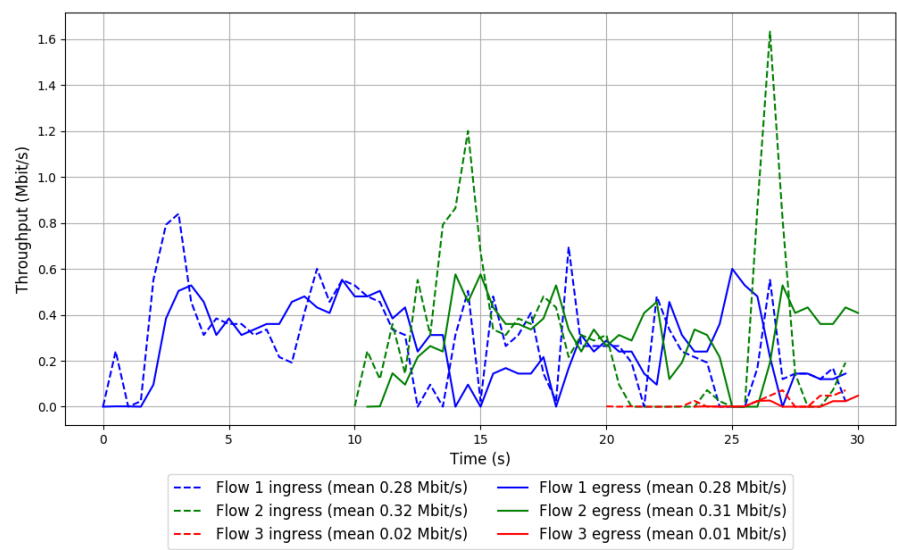
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 3547.343 ms

Loss rate: 55.68%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-10 00:43:36

End at: 2018-08-10 00:44:06

Local clock offset: -1.607 ms

Remote clock offset: 1.71 ms

# Below is generated by plot.py at 2018-08-10 00:52:46

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 2939.520 ms

Loss rate: 6.85%

-- Flow 1:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 2928.402 ms

Loss rate: 4.19%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 2957.901 ms

Loss rate: 9.51%

-- Flow 3:

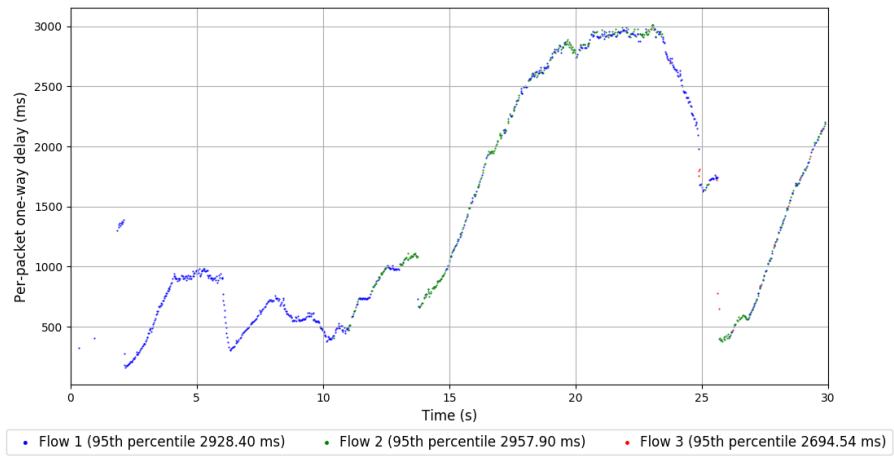
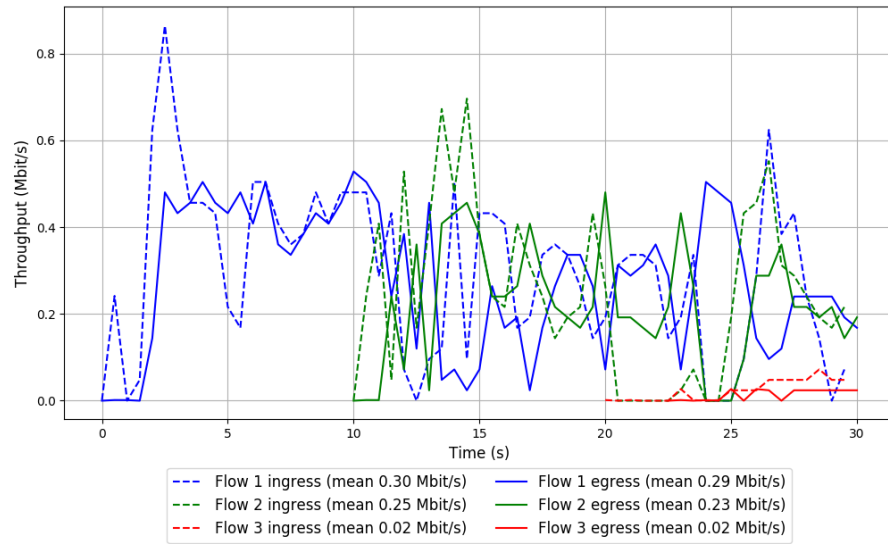
Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 2694.544 ms

Loss rate: 51.63%



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



Run 1: Statistics of Copa

Start at: 2018-08-09 23:52:51

End at: 2018-08-09 23:53:21

Local clock offset: -3.262 ms

Remote clock offset: 3.529 ms

# Below is generated by plot.py at 2018-08-10 00:52:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 1462.120 ms

Loss rate: 6.47%

-- Flow 1:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 1358.814 ms

Loss rate: 5.96%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 1466.613 ms

Loss rate: 7.54%

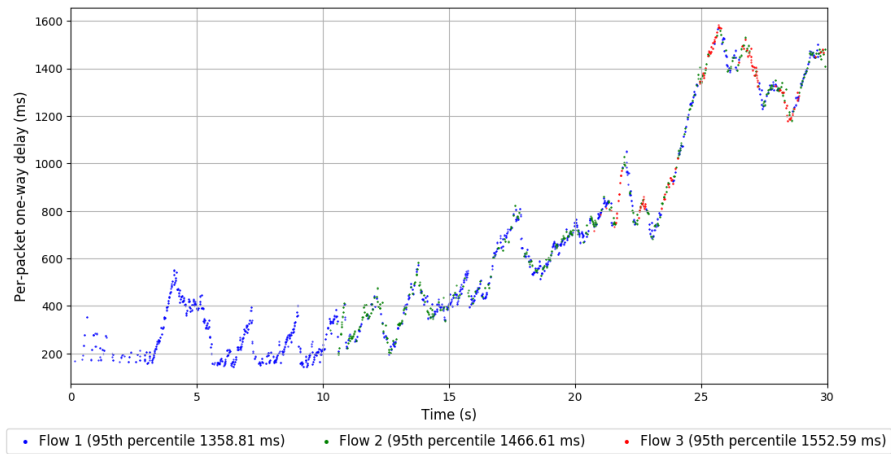
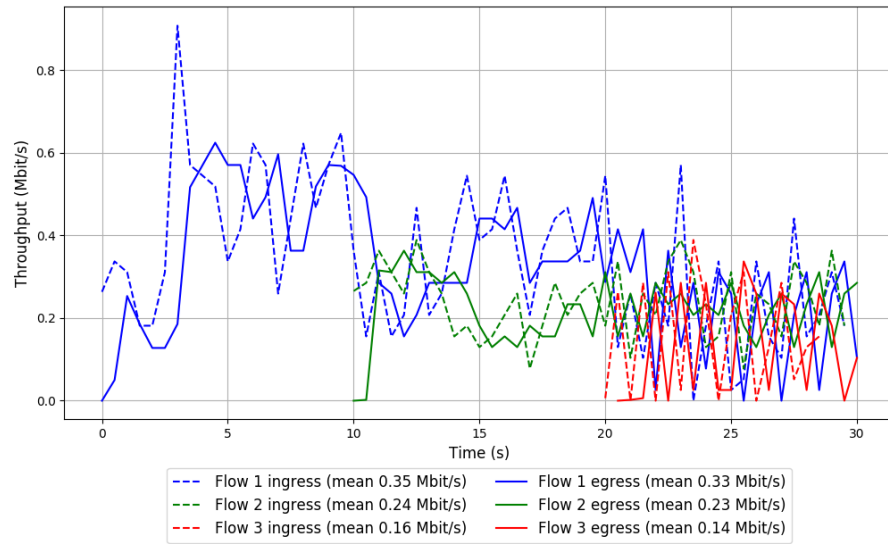
-- Flow 3:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 1552.592 ms

Loss rate: 6.52%

## Run 1: Report of Copa — Data Link



Run 2: Statistics of Copa

Start at: 2018-08-10 00:13:33

End at: 2018-08-10 00:14:03

Local clock offset: -3.597 ms

Remote clock offset: 2.677 ms

# Below is generated by plot.py at 2018-08-10 00:52:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.48 Mbit/s

95th percentile per-packet one-way delay: 908.069 ms

Loss rate: 3.85%

-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 847.734 ms

Loss rate: 1.71%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 984.034 ms

Loss rate: 5.08%

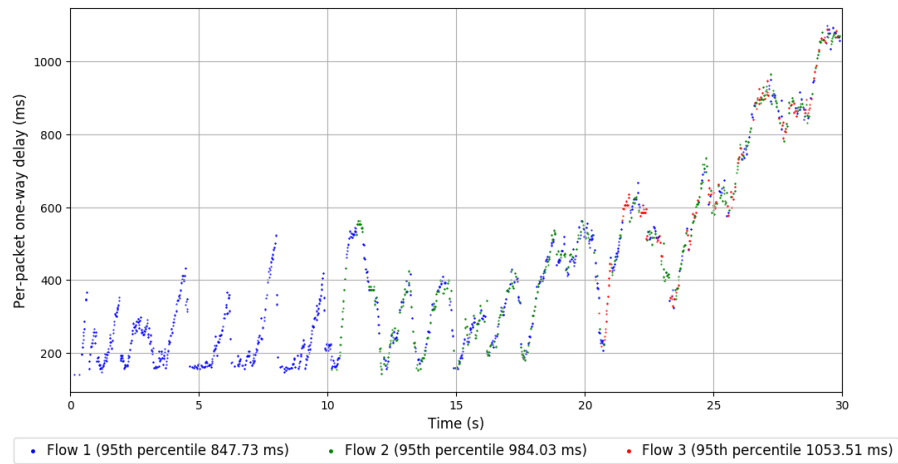
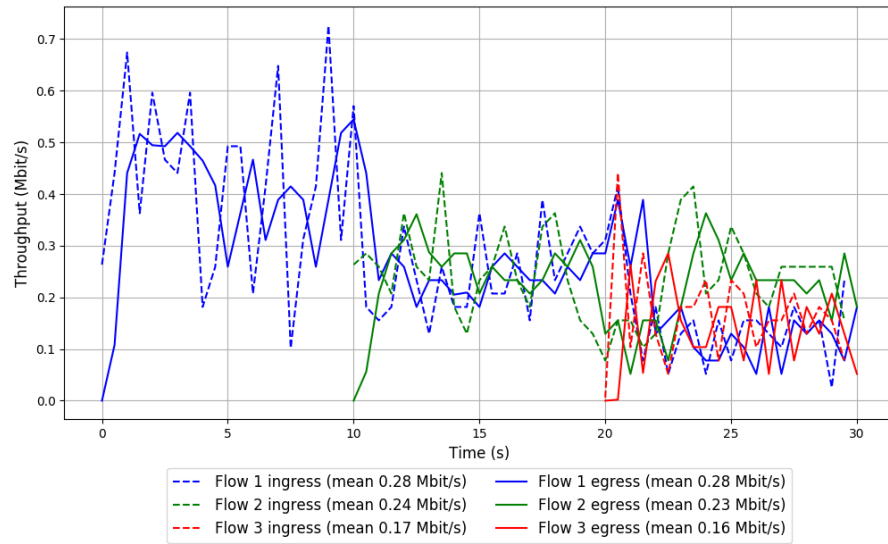
-- Flow 3:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 1053.506 ms

Loss rate: 11.00%

## Run 2: Report of Copa — Data Link



Run 3: Statistics of Copa

Start at: 2018-08-10 00:33:58

End at: 2018-08-10 00:34:28

Local clock offset: -2.562 ms

Remote clock offset: 2.911 ms

# Below is generated by plot.py at 2018-08-10 00:52:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.49 Mbit/s

95th percentile per-packet one-way delay: 847.352 ms

Loss rate: 3.55%

-- Flow 1:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 796.396 ms

Loss rate: 2.54%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 876.135 ms

Loss rate: 3.57%

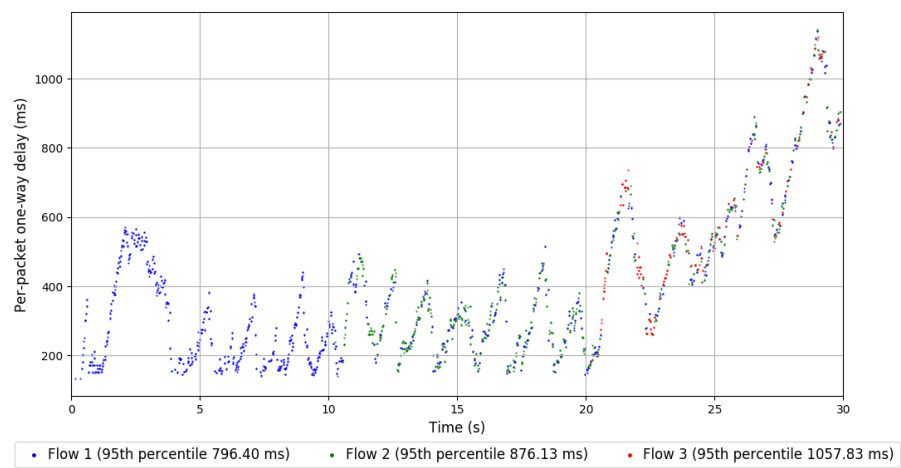
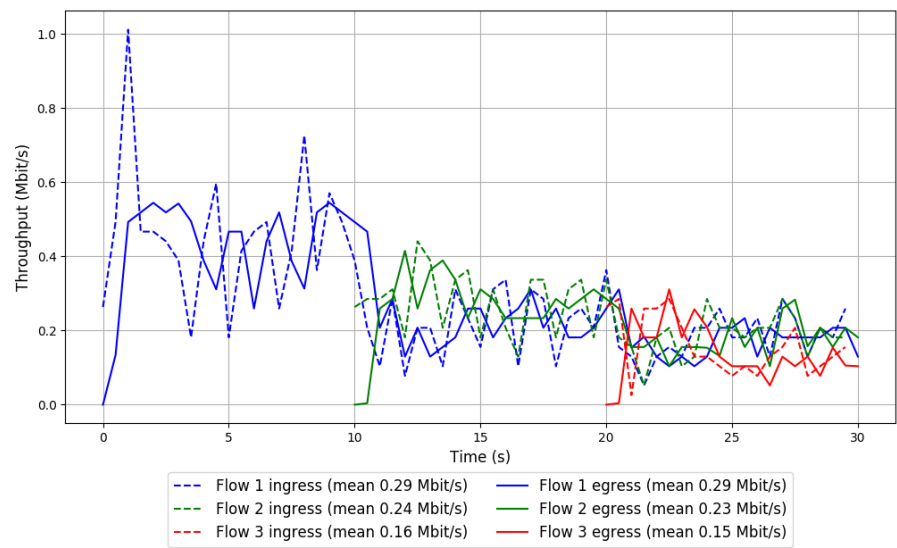
-- Flow 3:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 1057.830 ms

Loss rate: 9.00%

Run 3: Report of Copa — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-09 23:54:03

End at: 2018-08-09 23:54:33

Local clock offset: -3.953 ms

Remote clock offset: 3.501 ms

# Below is generated by plot.py at 2018-08-10 00:52:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 8247.937 ms

Loss rate: 32.24%

-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 8258.355 ms

Loss rate: 31.48%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6241.749 ms

Loss rate: 52.83%

-- Flow 3:

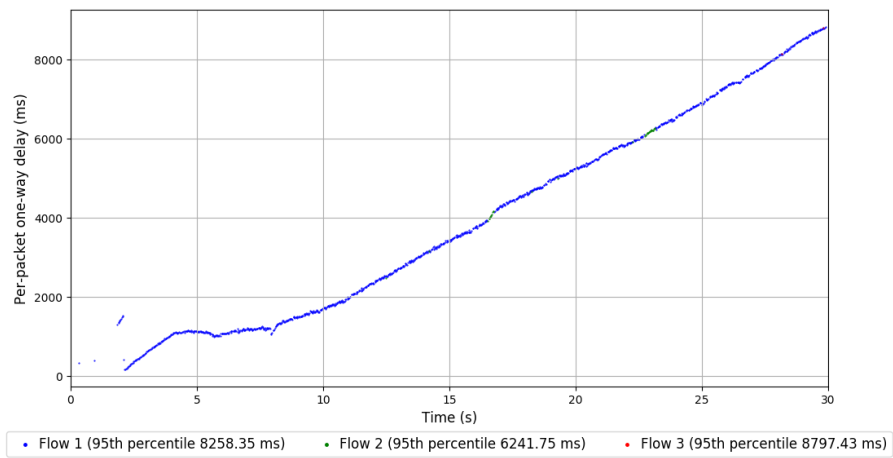
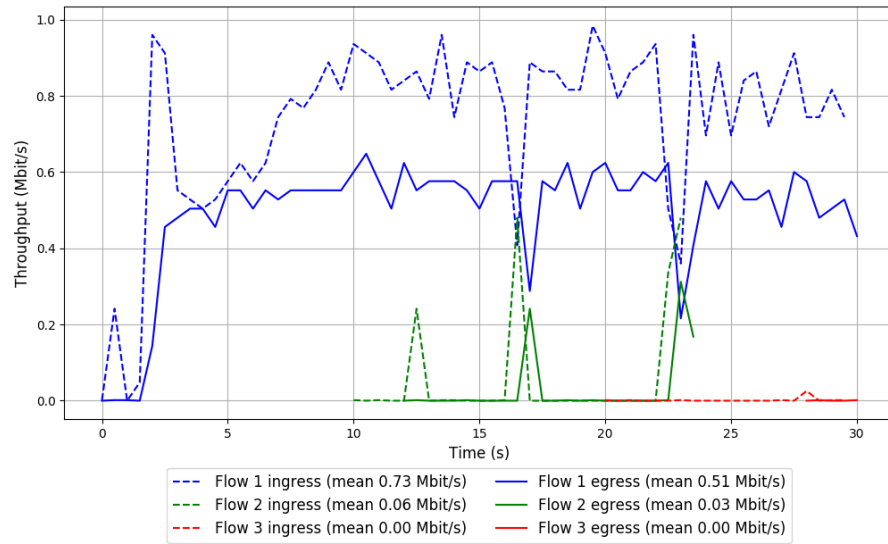
Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8797.429 ms

Loss rate: 91.06%



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



Run 2: Statistics of TCP Cubic

Start at: 2018-08-10 00:14:45

End at: 2018-08-10 00:15:15

Local clock offset: -3.613 ms

Remote clock offset: 2.72 ms

# Below is generated by plot.py at 2018-08-10 00:52:47

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.52 Mbit/s

95th percentile per-packet one-way delay: 8194.851 ms

Loss rate: 31.98%

-- Flow 1:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 8204.511 ms

Loss rate: 31.20%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6394.254 ms

Loss rate: 52.83%

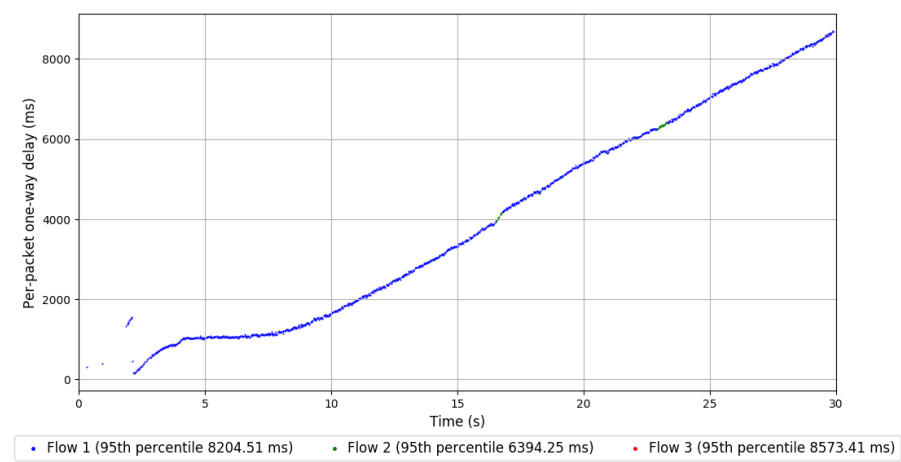
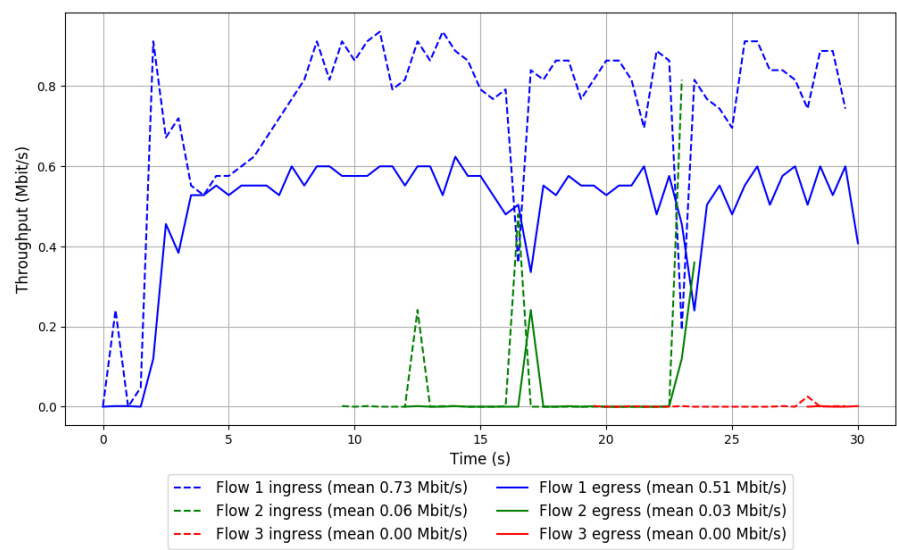
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8573.407 ms

Loss rate: 91.06%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-10 00:35:10

End at: 2018-08-10 00:35:40

Local clock offset: -3.36 ms

Remote clock offset: 6.555 ms

# Below is generated by plot.py at 2018-08-10 00:52:50

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 8194.073 ms

Loss rate: 32.95%

-- Flow 1:

Average throughput: 0.44 Mbit/s

95th percentile per-packet one-way delay: 8204.097 ms

Loss rate: 32.09%

-- Flow 2:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 6474.357 ms

Loss rate: 52.87%

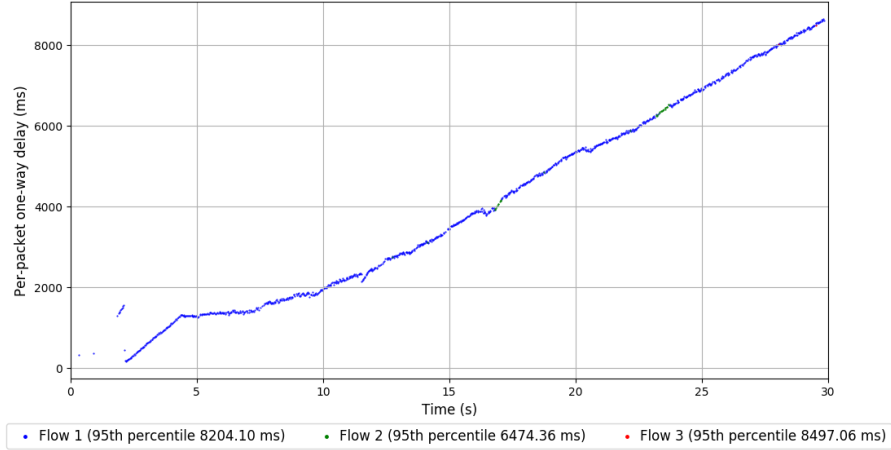
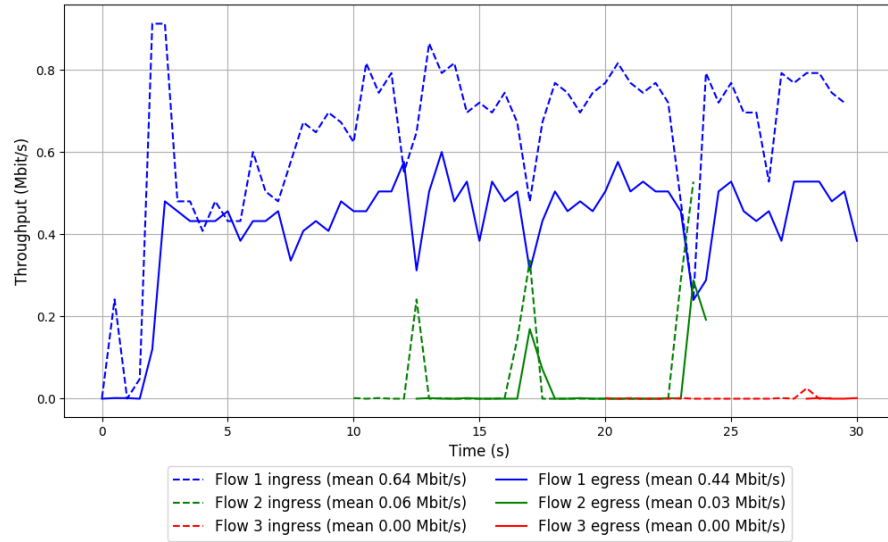
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8497.062 ms

Loss rate: 90.68%

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



Run 1: Statistics of FillP

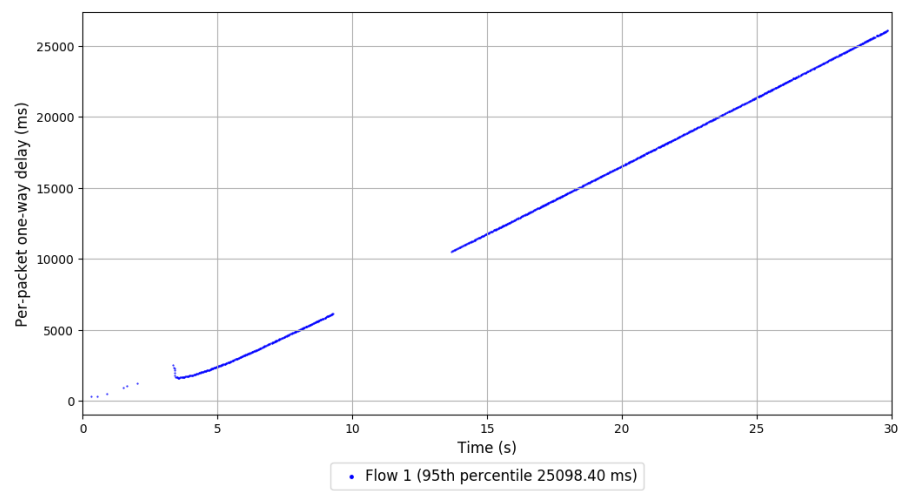
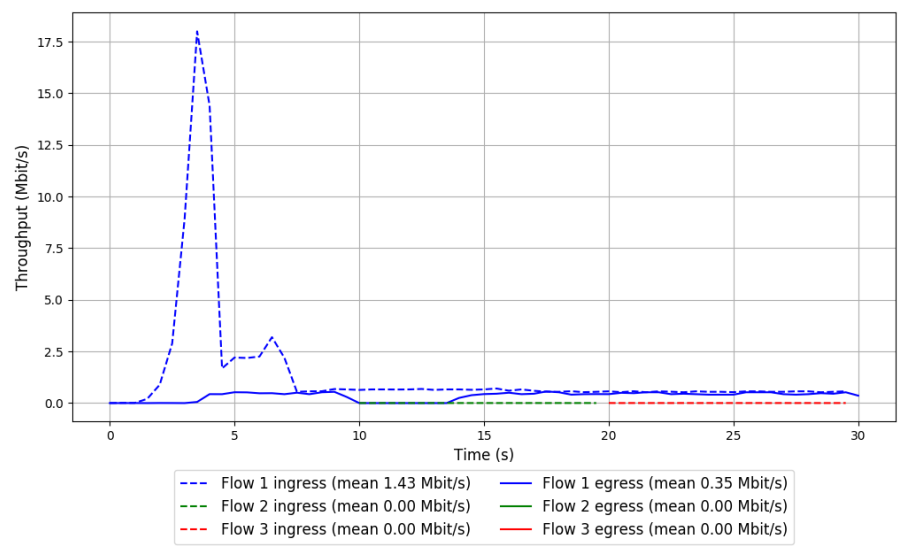
Start at: 2018-08-10 00:04:57

End at: 2018-08-10 00:05:27

Local clock offset: -4.453 ms

Remote clock offset: 7.471 ms

Run 1: Report of FillP — Data Link



Run 2: Statistics of FillP

Start at: 2018-08-10 00:25:32

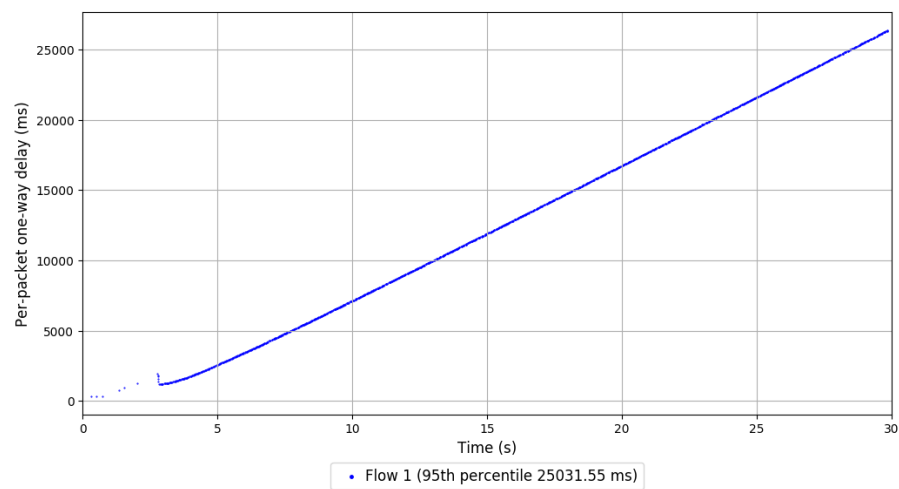
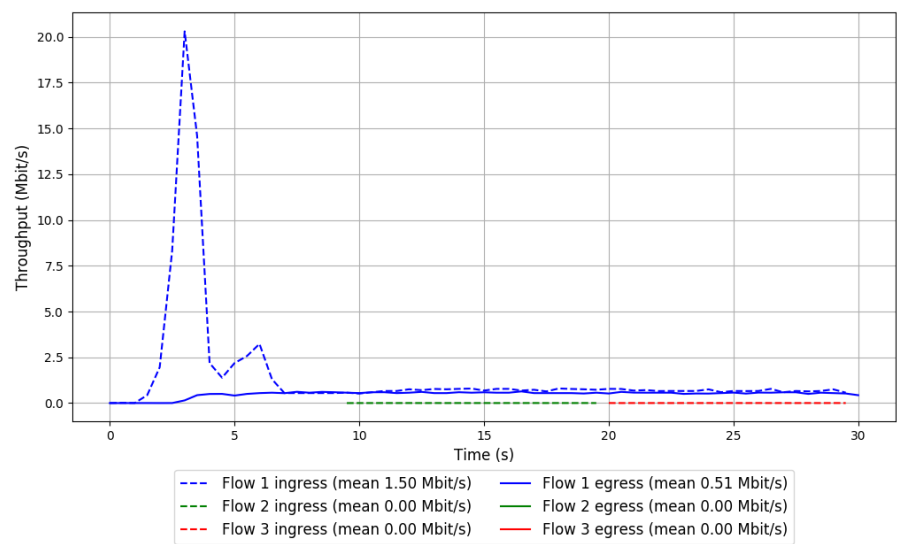
End at: 2018-08-10 00:26:02

Local clock offset: -2.859 ms

Remote clock offset: 6.847 ms



Run 2: Report of FillP — Data Link



Run 3: Statistics of FillP

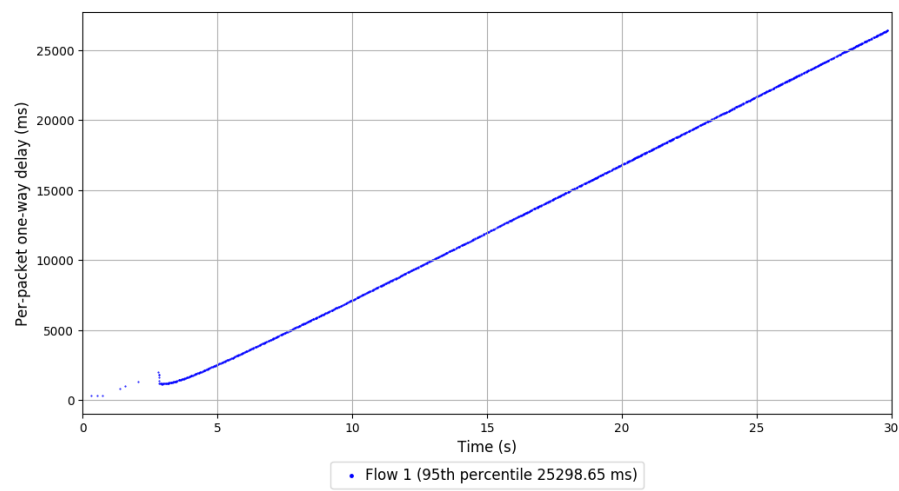
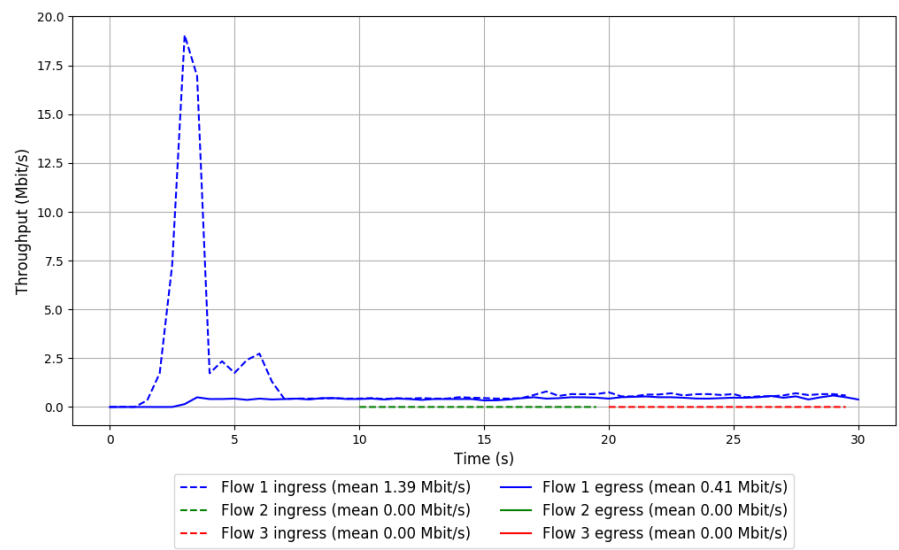
Start at: 2018-08-10 00:45:59

End at: 2018-08-10 00:46:29

Local clock offset: -2.367 ms

Remote clock offset: 6.462 ms

Run 3: Report of FillP — Data Link



Run 1: Statistics of FillP-Sheep

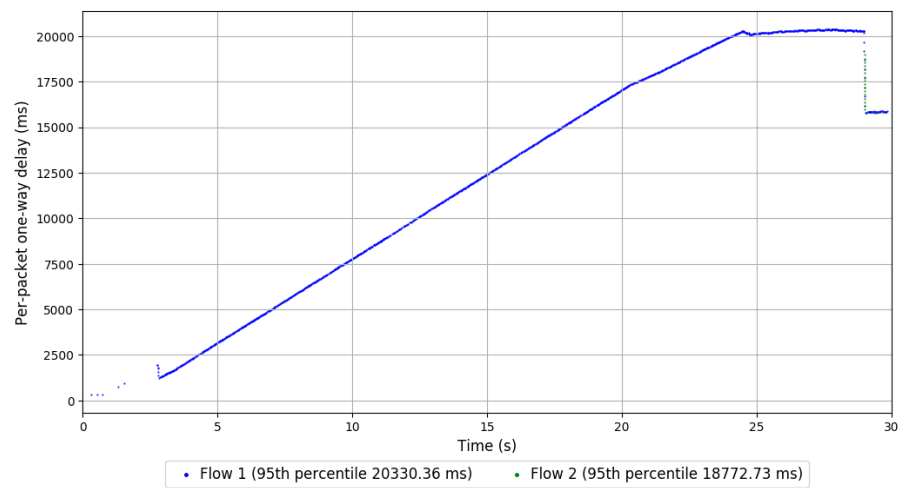
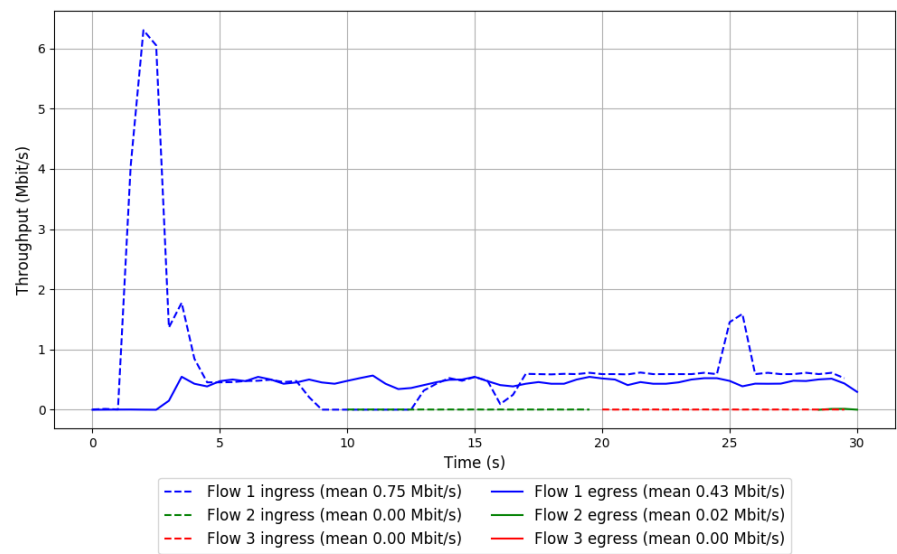
Start at: 2018-08-09 23:55:14

End at: 2018-08-09 23:55:44

Local clock offset: -3.935 ms

Remote clock offset: 2.541 ms

Run 1: Report of FillP-Sheep — Data Link



Run 2: Statistics of FillP-Sheep

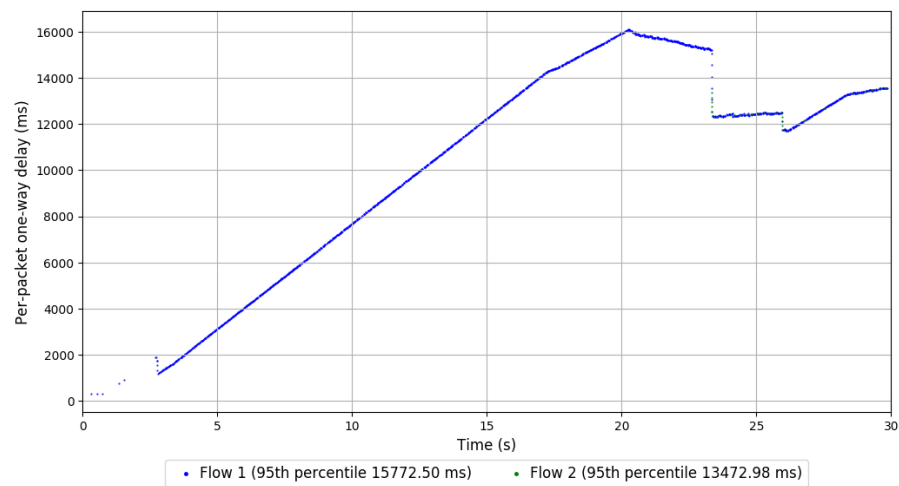
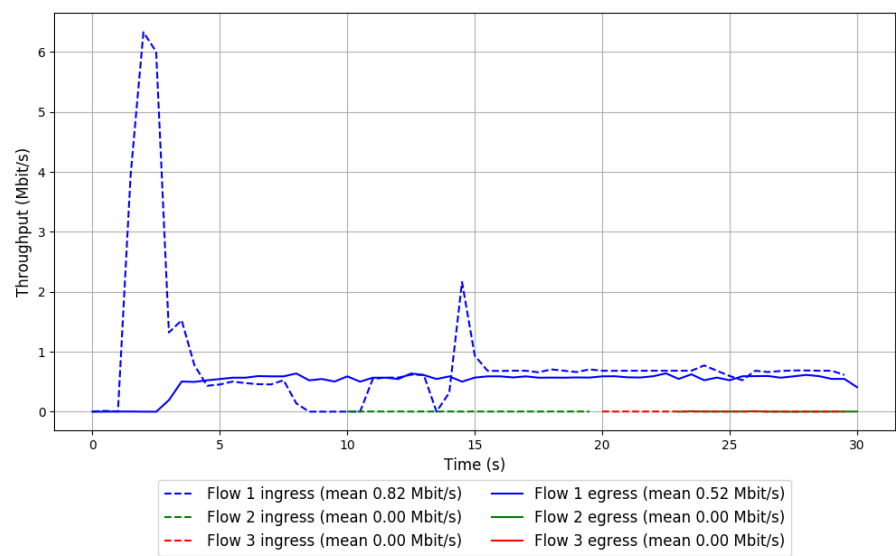
Start at: 2018-08-10 00:15:57

End at: 2018-08-10 00:16:27

Local clock offset: -3.571 ms

Remote clock offset: 8.486 ms

Run 2: Report of FillP-Sheep — Data Link



Run 3: Statistics of FillP-Sheep

Start at: 2018-08-10 00:36:22

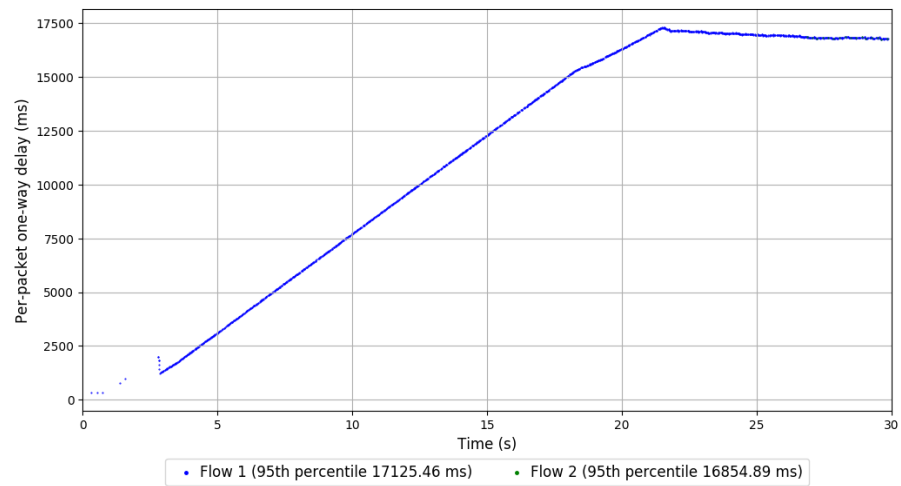
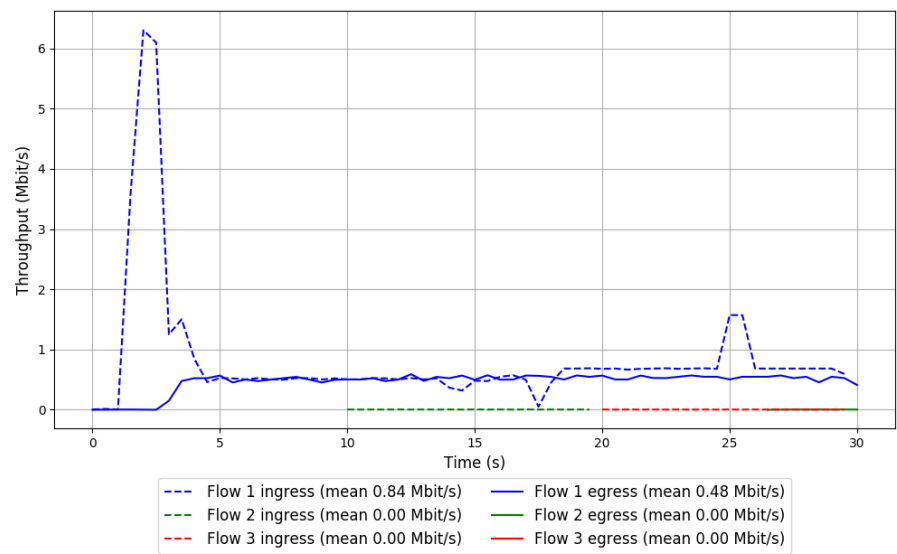
End at: 2018-08-10 00:36:52

Local clock offset: -2.518 ms

Remote clock offset: 6.615 ms



Run 3: Report of FillP-Sheep — Data Link

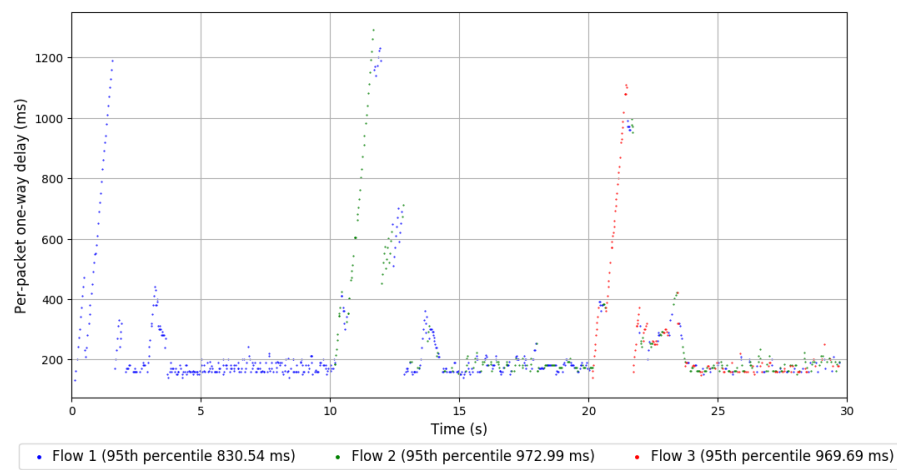
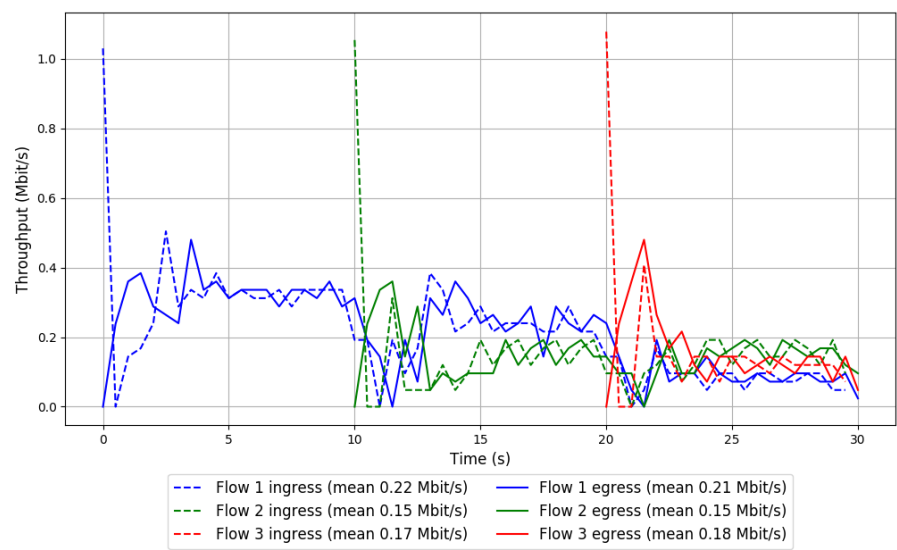


```
Run 1: Statistics of Indigo

Start at: 2018-08-10 00:06:18
End at: 2018-08-10 00:06:48
Local clock offset: -4.422 ms
Remote clock offset: 2.529 ms

# Below is generated by plot.py at 2018-08-10 00:52:53
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.37 Mbit/s
95th percentile per-packet one-way delay: 940.449 ms
Loss rate: 0.86%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 830.544 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 972.987 ms
Loss rate: 1.58%
-- Flow 3:
Average throughput: 0.18 Mbit/s
95th percentile per-packet one-way delay: 969.691 ms
Loss rate: 2.11%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-10 00:26:45

End at: 2018-08-10 00:27:15

Local clock offset: -2.033 ms

Remote clock offset: 3.071 ms

# Below is generated by plot.py at 2018-08-10 00:52:55

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.43 Mbit/s

95th percentile per-packet one-way delay: 755.149 ms

Loss rate: 1.11%

-- Flow 1:

Average throughput: 0.19 Mbit/s

95th percentile per-packet one-way delay: 547.222 ms

Loss rate: 0.85%

-- Flow 2:

Average throughput: 0.29 Mbit/s

95th percentile per-packet one-way delay: 624.999 ms

Loss rate: 1.03%

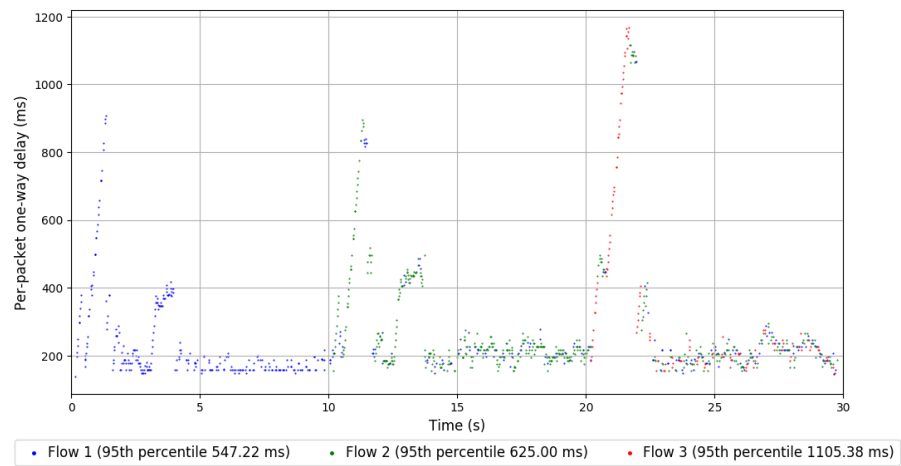
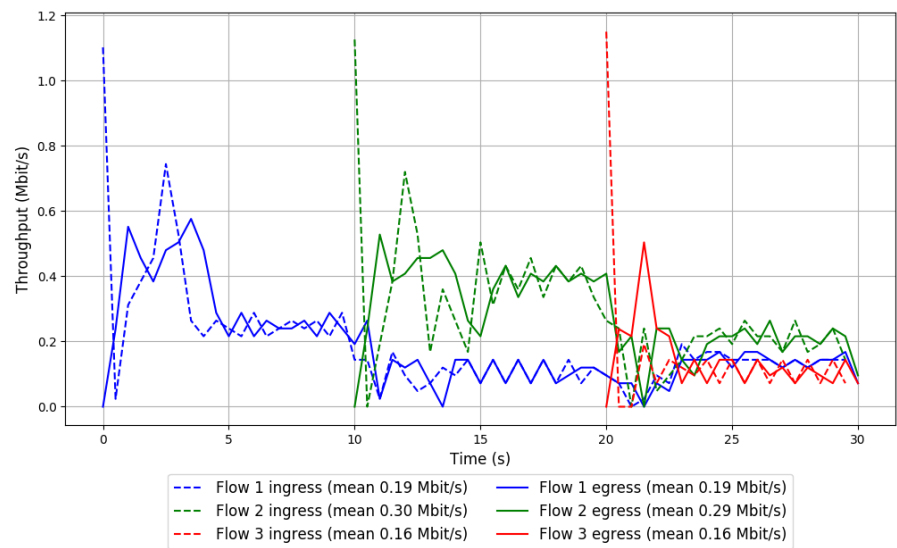
-- Flow 3:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 1105.378 ms

Loss rate: 2.35%

Run 2: Report of Indigo — Data Link

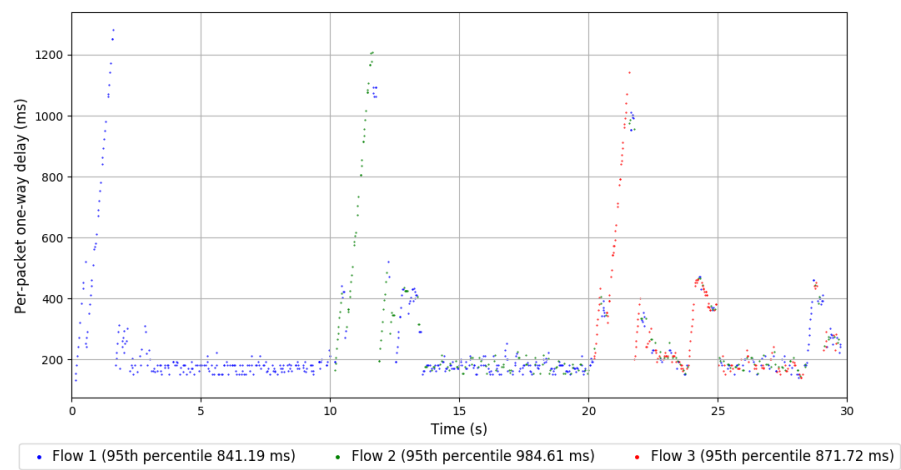
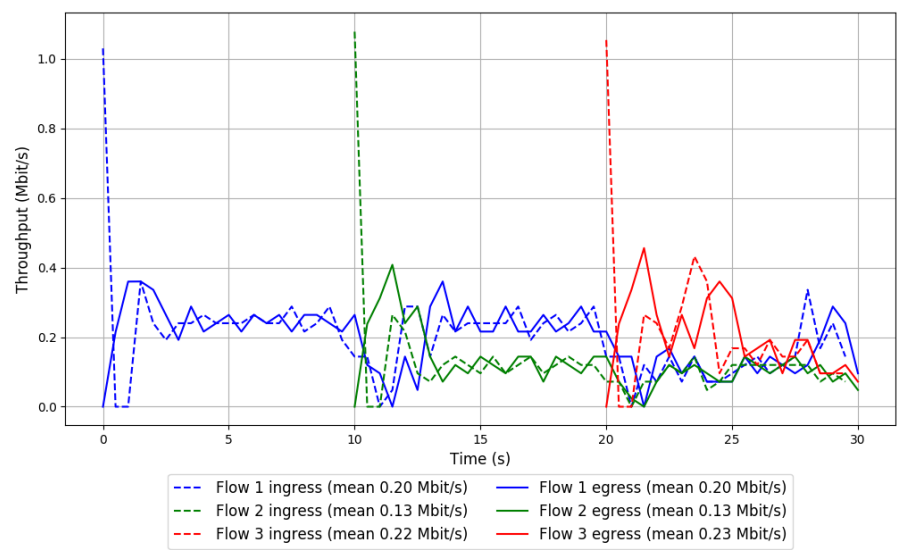


Run 3: Statistics of Indigo

Start at: 2018-08-10 00:47:17  
End at: 2018-08-10 00:47:47  
Local clock offset: -2.509 ms  
Remote clock offset: 2.787 ms

# Below is generated by plot.py at 2018-08-10 00:52:56  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.36 Mbit/s  
95th percentile per-packet one-way delay: 934.882 ms  
Loss rate: 1.45%  
-- Flow 1:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 841.187 ms  
Loss rate: 1.19%  
-- Flow 2:  
Average throughput: 0.13 Mbit/s  
95th percentile per-packet one-way delay: 984.613 ms  
Loss rate: 1.40%  
-- Flow 3:  
Average throughput: 0.23 Mbit/s  
95th percentile per-packet one-way delay: 871.715 ms  
Loss rate: 2.22%

Run 3: Report of Indigo — Data Link



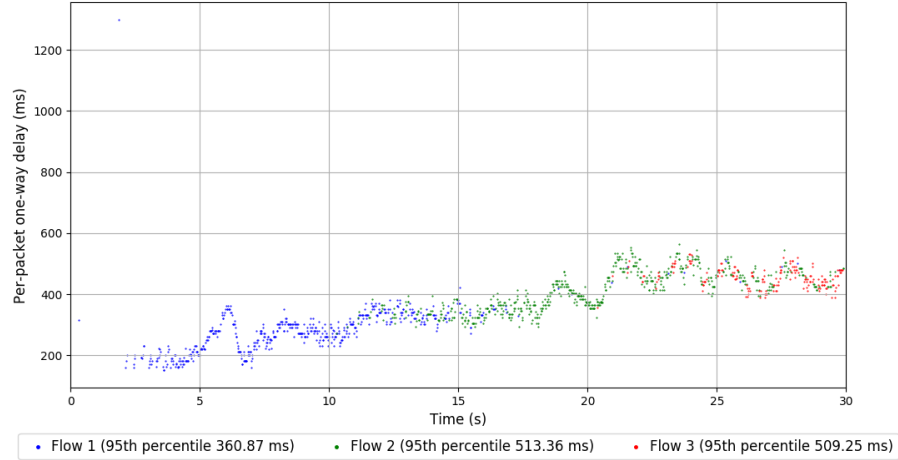
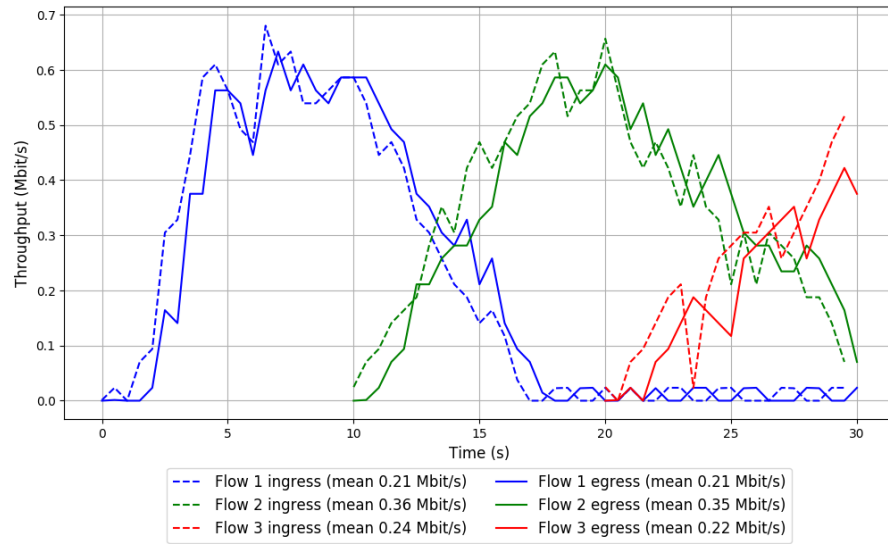
```
Run 1: Statistics of LEDBAT

Start at: 2018-08-09 23:56:26
End at: 2018-08-09 23:56:56
Local clock offset: -4.688 ms
Remote clock offset: 2.426 ms

# Below is generated by plot.py at 2018-08-10 00:52:56
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.52 Mbit/s
95th percentile per-packet one-way delay: 502.788 ms
Loss rate: 2.17%
-- Flow 1:
Average throughput: 0.21 Mbit/s
95th percentile per-packet one-way delay: 360.872 ms
Loss rate: 0.19%
-- Flow 2:
Average throughput: 0.35 Mbit/s
95th percentile per-packet one-way delay: 513.358 ms
Loss rate: 1.01%
-- Flow 3:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 509.253 ms
Loss rate: 10.89%
```



# Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2018-08-10 00:17:09

End at: 2018-08-10 00:17:39

Local clock offset: -2.679 ms

Remote clock offset: 3.409 ms

# Below is generated by plot.py at 2018-08-10 00:52:56

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 441.259 ms

Loss rate: 1.00%

-- Flow 1:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 361.858 ms

Loss rate: 0.00%

-- Flow 2:

Average throughput: 0.32 Mbit/s

95th percentile per-packet one-way delay: 451.414 ms

Loss rate: 0.93%

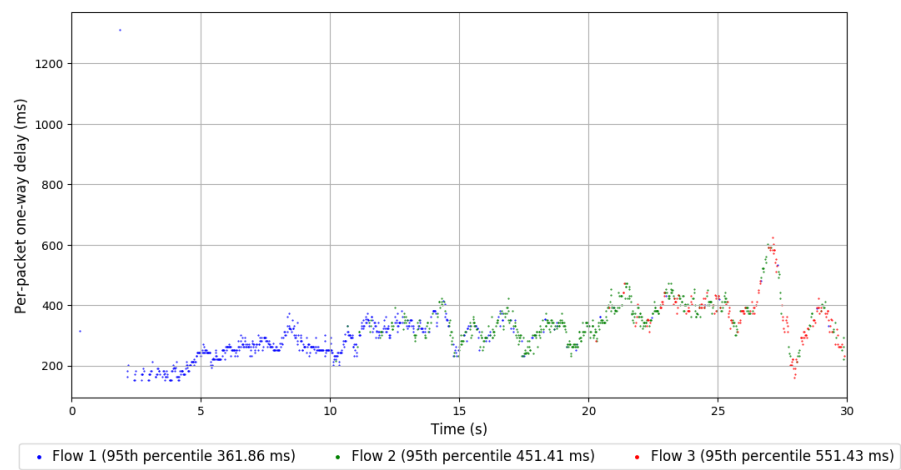
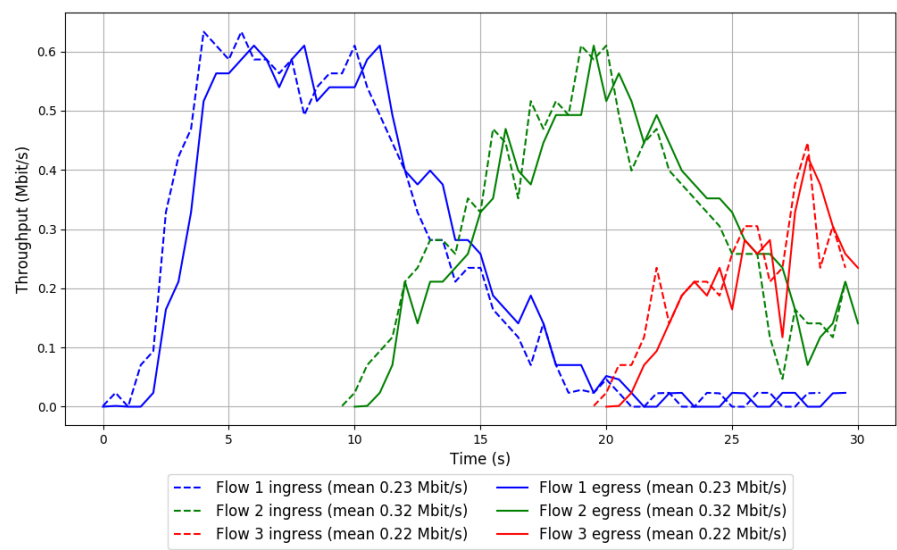
-- Flow 3:

Average throughput: 0.22 Mbit/s

95th percentile per-packet one-way delay: 551.435 ms

Loss rate: 4.30%

Run 2: Report of LEDBAT — Data Link

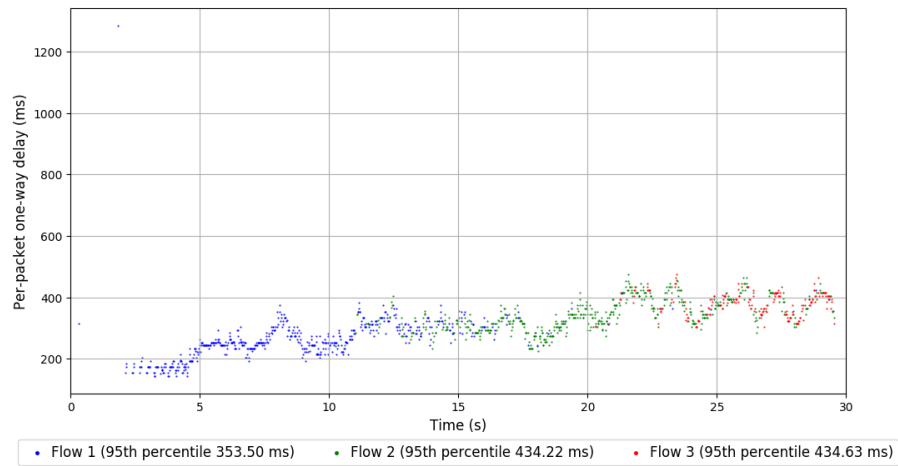
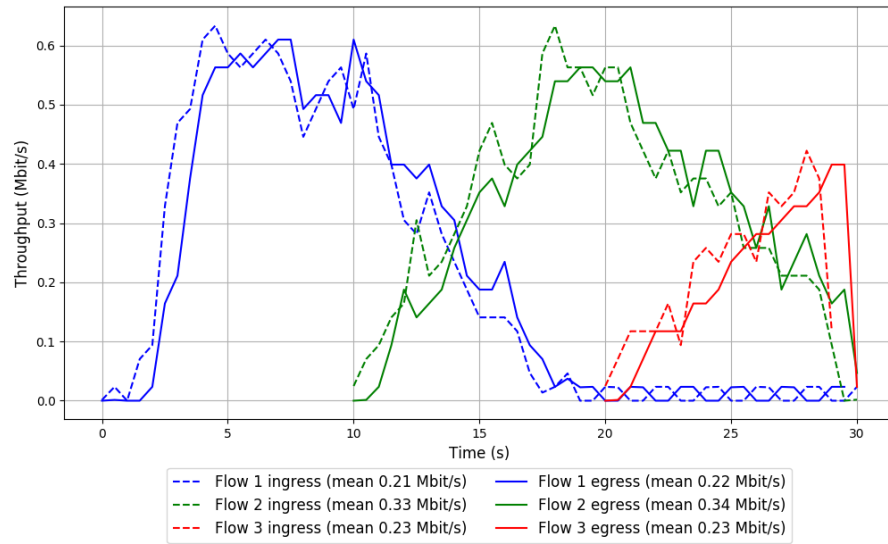


Run 3: Statistics of LEDBAT

Start at: 2018-08-10 00:37:34  
End at: 2018-08-10 00:38:04  
Local clock offset: -2.555 ms  
Remote clock offset: 5.58 ms

```
# Below is generated by plot.py at 2018-08-10 00:52:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.51 Mbit/s
95th percentile per-packet one-way delay: 424.228 ms
Loss rate: 0.16%
-- Flow 1:
Average throughput: 0.22 Mbit/s
95th percentile per-packet one-way delay: 353.505 ms
Loss rate: 0.18%
-- Flow 2:
Average throughput: 0.34 Mbit/s
95th percentile per-packet one-way delay: 434.219 ms
Loss rate: 0.01%
-- Flow 3:
Average throughput: 0.23 Mbit/s
95th percentile per-packet one-way delay: 434.628 ms
Loss rate: 0.56%
```

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



Run 1: Statistics of PCC-Allegro

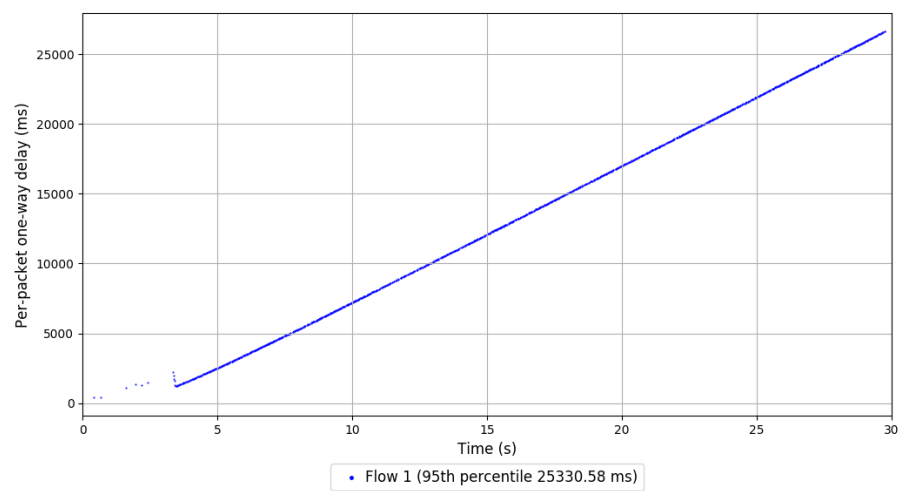
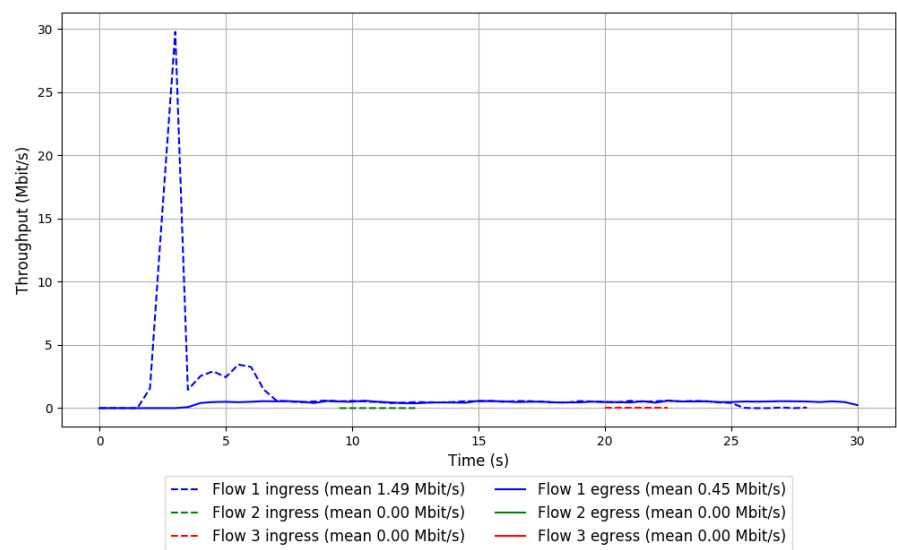
Start at: 2018-08-10 00:07:30

End at: 2018-08-10 00:08:00

Local clock offset: -3.639 ms

Remote clock offset: 2.581 ms

Run 1: Report of PCC-Allegro — Data Link



Run 2: Statistics of PCC-Allegro

Start at: 2018-08-10 00:27:56

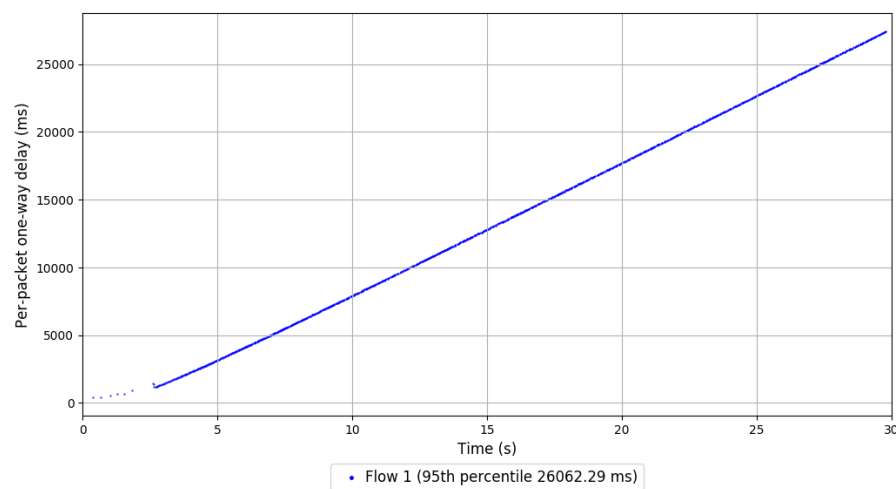
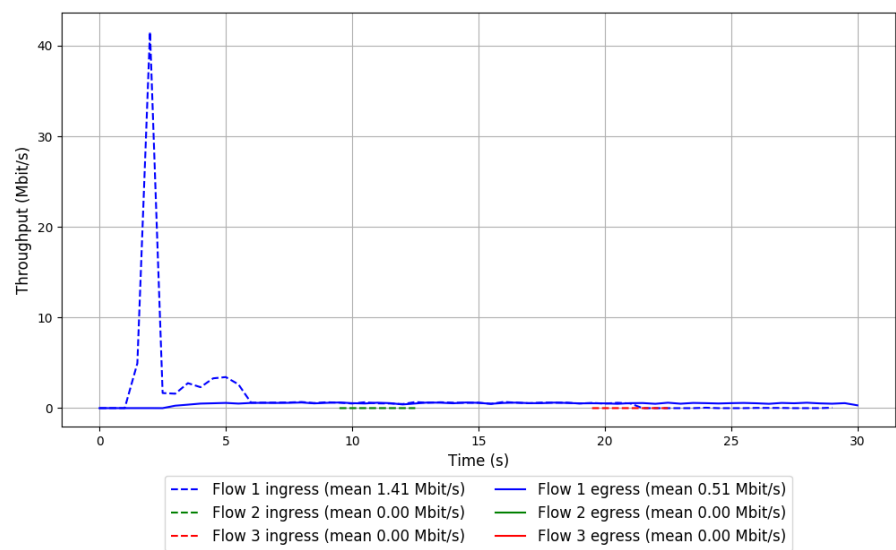
End at: 2018-08-10 00:28:26

Local clock offset: -2.775 ms

Remote clock offset: 3.046 ms



Run 2: Report of PCC-Allegro — Data Link



Run 3: Statistics of PCC-Allegro

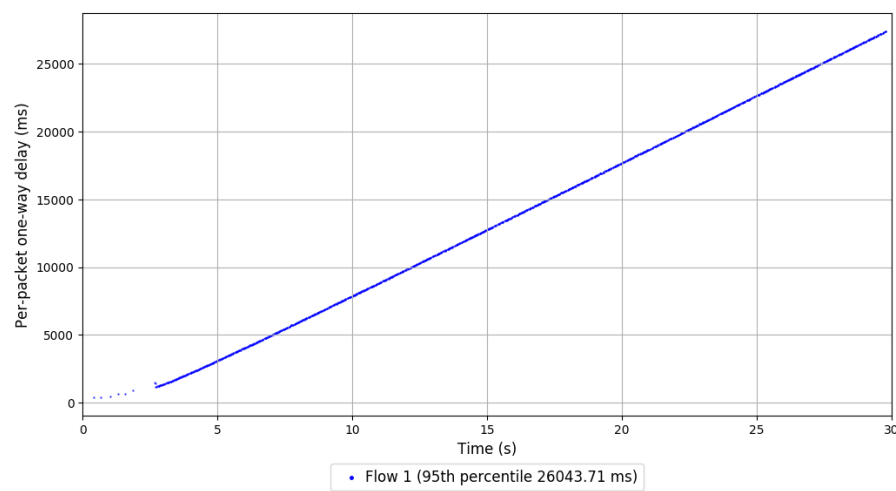
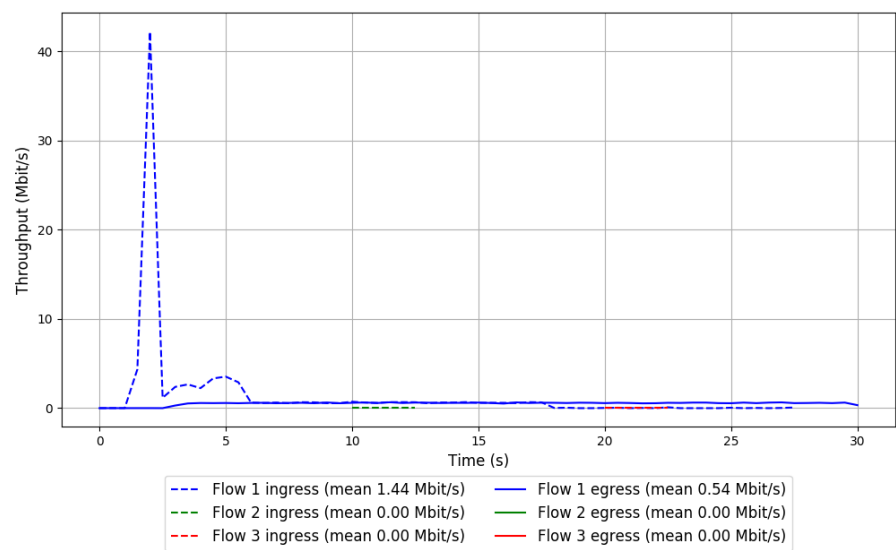
Start at: 2018-08-10 00:48:28

End at: 2018-08-10 00:48:58

Local clock offset: -1.735 ms

Remote clock offset: 2.734 ms

Run 3: Report of PCC-Allegro — Data Link



Run 1: Statistics of PCC-Expr

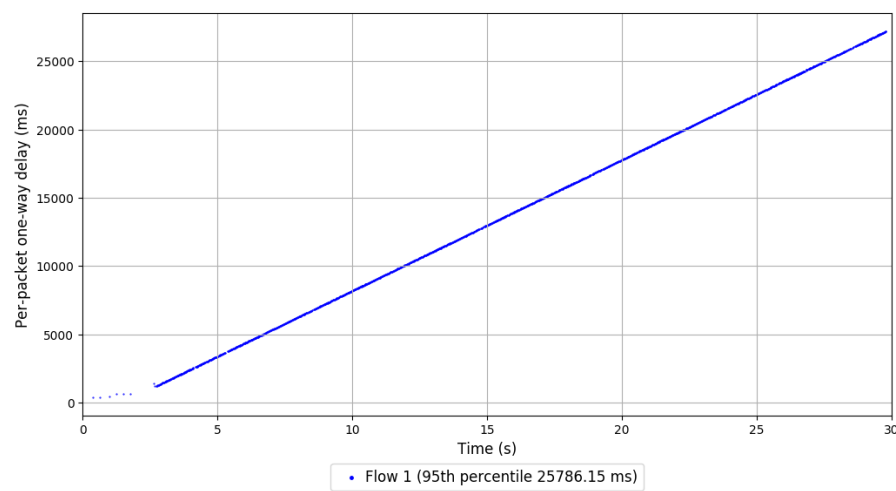
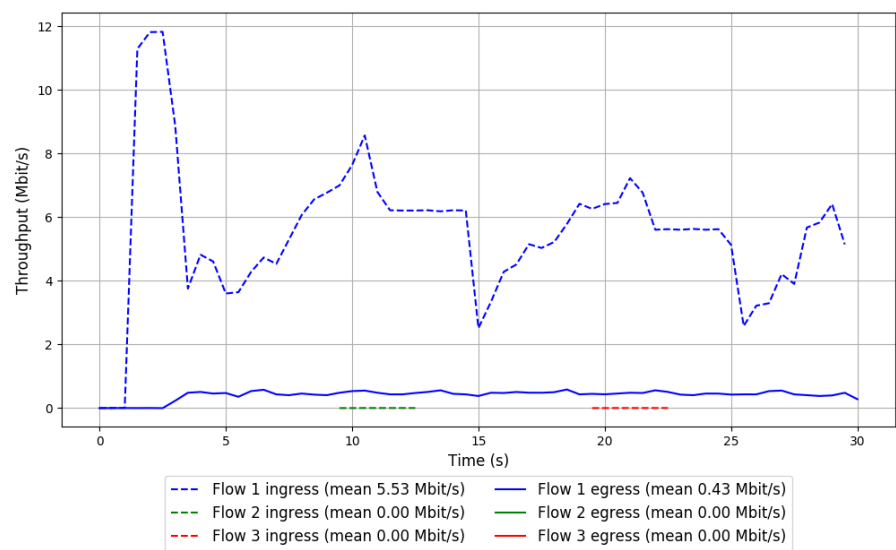
Start at: 2018-08-09 23:58:50

End at: 2018-08-09 23:59:20

Local clock offset: -3.804 ms

Remote clock offset: 7.255 ms

Run 1: Report of PCC-Expr — Data Link



Run 2: Statistics of PCC-Expr

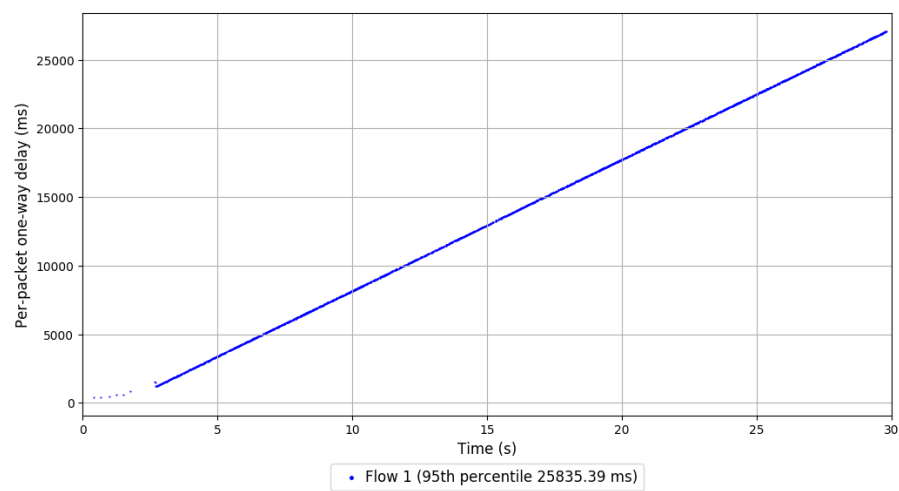
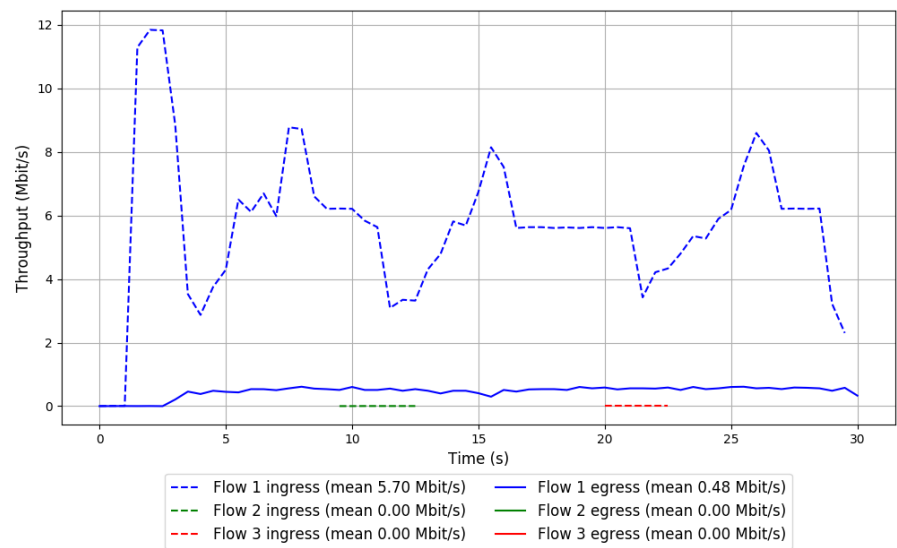
Start at: 2018-08-10 00:19:33

End at: 2018-08-10 00:20:03

Local clock offset: -2.456 ms

Remote clock offset: 5.886 ms

Run 2: Report of PCC-Expr — Data Link



Run 3: Statistics of PCC-Expr

Start at: 2018-08-10 00:39:57

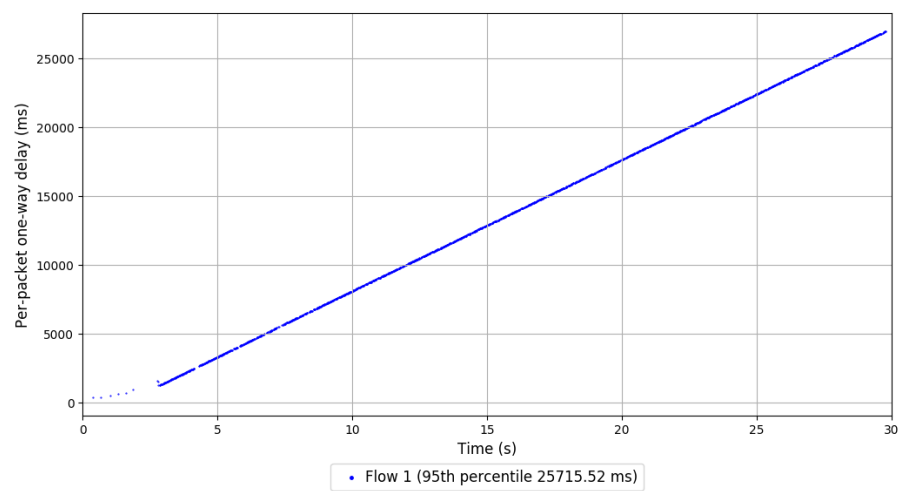
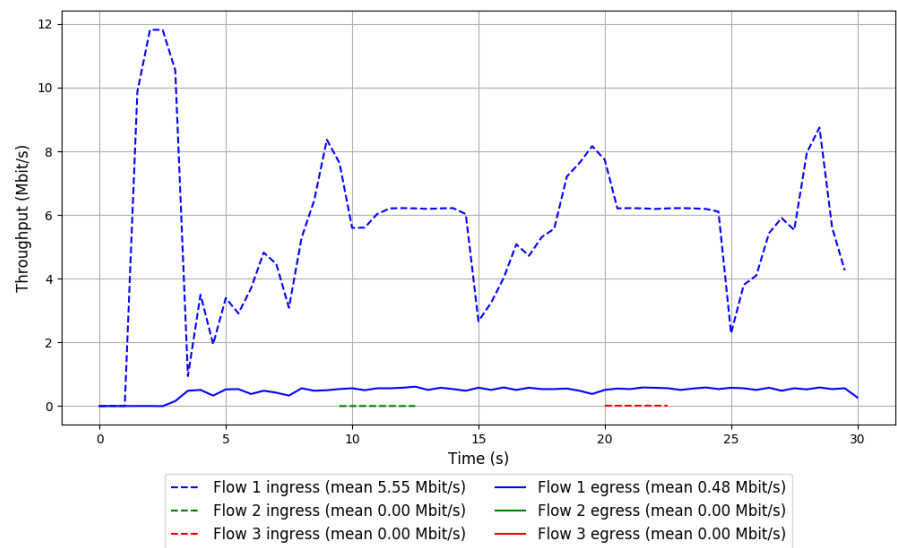
End at: 2018-08-10 00:40:27

Local clock offset: -1.669 ms

Remote clock offset: 6.574 ms



Run 3: Report of PCC-Expr — Data Link



Run 1: Statistics of QUIC Cubic

Start at: 2018-08-09 23:57:38

End at: 2018-08-09 23:58:08

Local clock offset: -3.827 ms

Remote clock offset: 8.392 ms

# Below is generated by plot.py at 2018-08-10 00:53:09

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 9073.103 ms

Loss rate: 33.36%

-- Flow 1:

Average throughput: 0.53 Mbit/s

95th percentile per-packet one-way delay: 9046.518 ms

Loss rate: 33.36%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 6277.908 ms

Loss rate: 0.00%

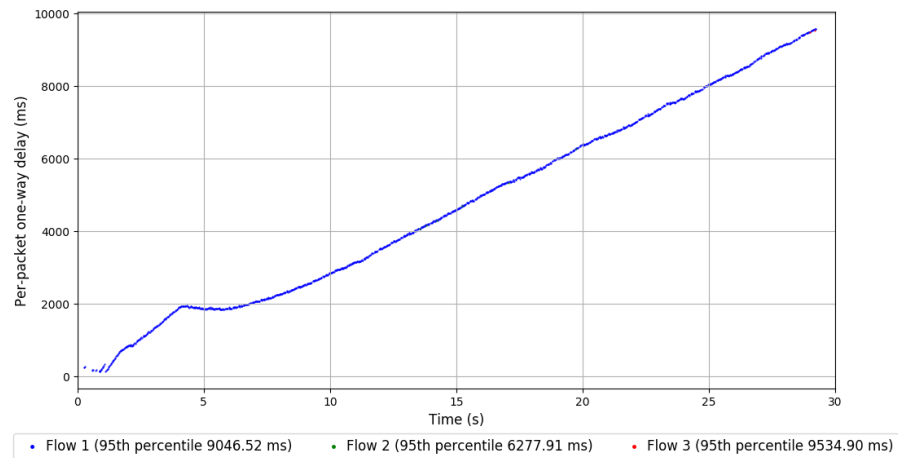
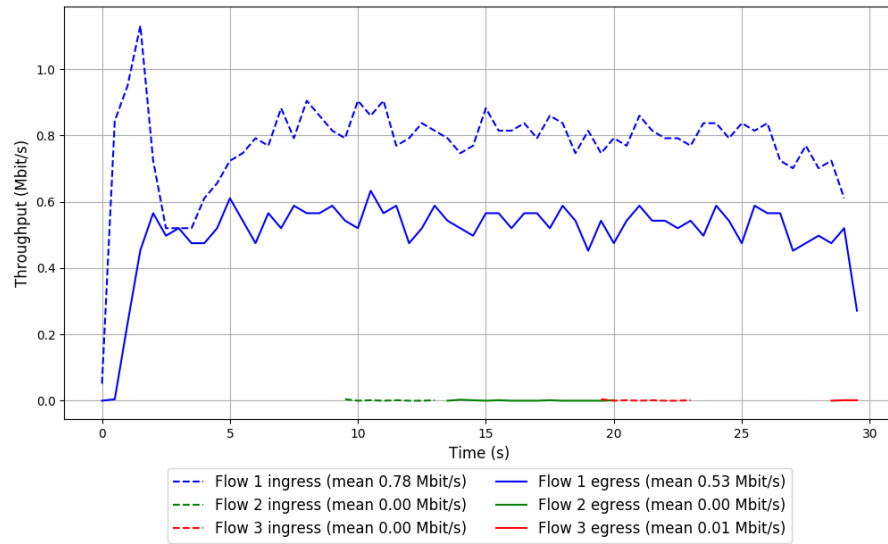
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 9534.903 ms

Loss rate: 66.67%

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



Run 2: Statistics of QUIC Cubic

Start at: 2018-08-10 00:18:21

End at: 2018-08-10 00:18:51

Local clock offset: -4.103 ms

Remote clock offset: 3.463 ms

# Below is generated by plot.py at 2018-08-10 00:53:09

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.48 Mbit/s

95th percentile per-packet one-way delay: 8550.794 ms

Loss rate: 34.06%

-- Flow 1:

Average throughput: 0.48 Mbit/s

95th percentile per-packet one-way delay: 8538.514 ms

Loss rate: 34.06%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 5614.920 ms

Loss rate: 0.00%

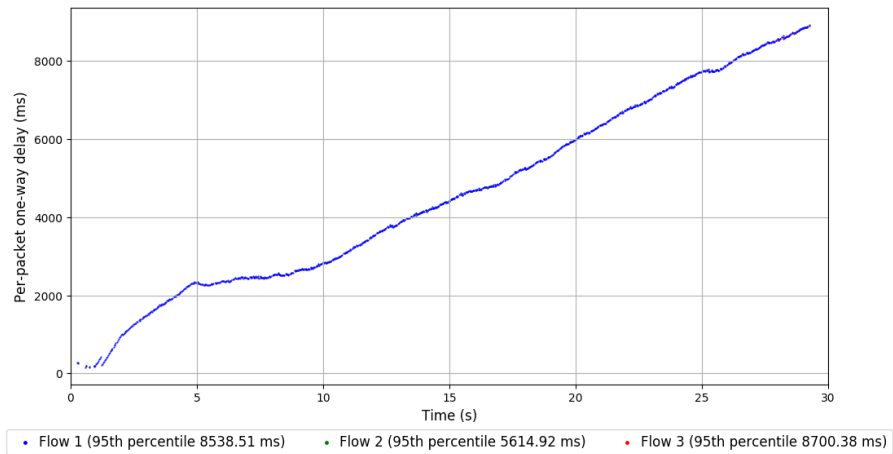
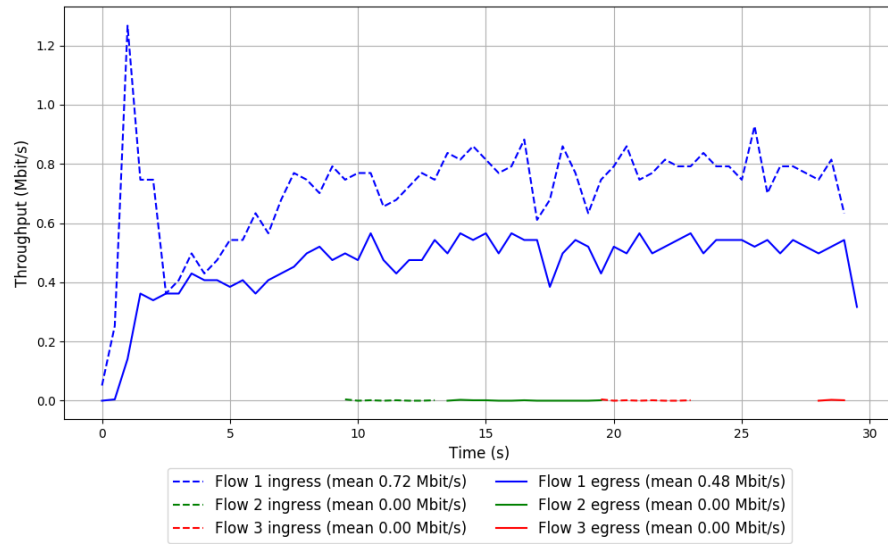
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8700.384 ms

Loss rate: 50.00%

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



Run 3: Statistics of QUIC Cubic

Start at: 2018-08-10 00:38:46

End at: 2018-08-10 00:39:16

Local clock offset: -2.525 ms

Remote clock offset: 5.585 ms

# Below is generated by plot.py at 2018-08-10 00:53:09

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8782.363 ms

Loss rate: 31.18%

-- Flow 1:

Average throughput: 0.54 Mbit/s

95th percentile per-packet one-way delay: 8781.968 ms

Loss rate: 31.18%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 5734.390 ms

Loss rate: 0.00%

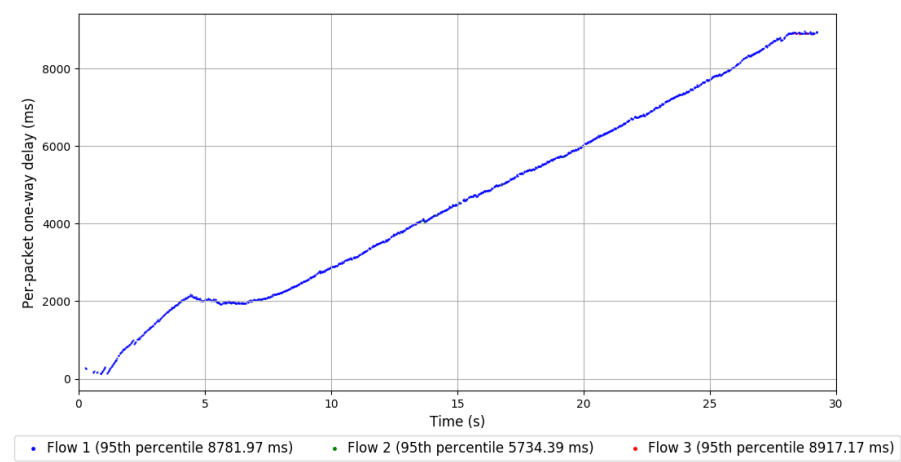
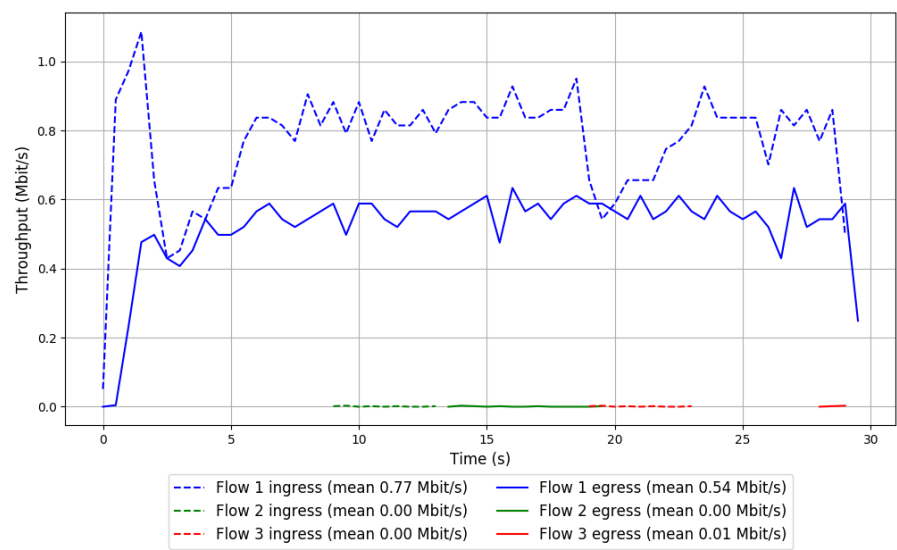
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 8917.173 ms

Loss rate: 50.00%

Run 3: Report of QUIC Cubic — Data Link



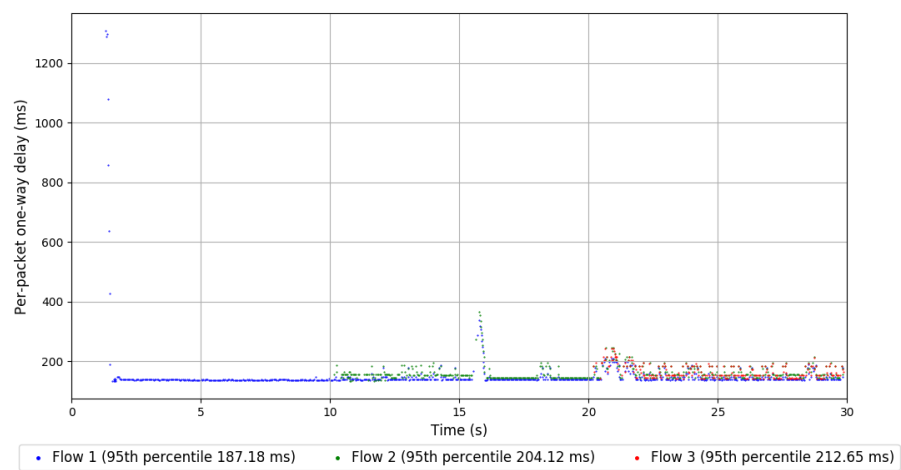
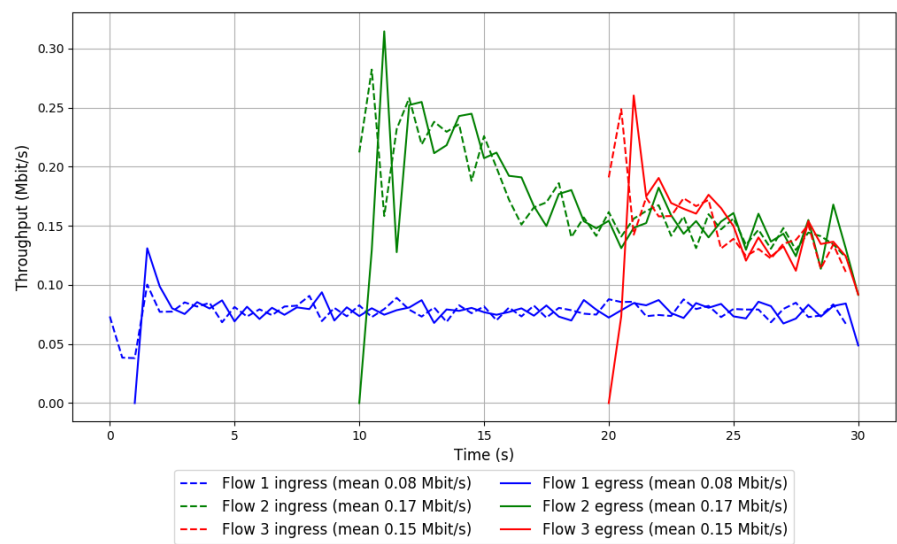
```
Run 1: Statistics of SReAM

Start at: 2018-08-10 00:03:46
End at: 2018-08-10 00:04:16
Local clock offset: -4.469 ms
Remote clock offset: 2.519 ms

# Below is generated by plot.py at 2018-08-10 00:53:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.25 Mbit/s
95th percentile per-packet one-way delay: 197.347 ms
Loss rate: 1.14%
-- Flow 1:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 187.178 ms
Loss rate: 0.79%
-- Flow 2:
Average throughput: 0.17 Mbit/s
95th percentile per-packet one-way delay: 204.115 ms
Loss rate: 1.02%
-- Flow 3:
Average throughput: 0.15 Mbit/s
95th percentile per-packet one-way delay: 212.648 ms
Loss rate: 1.97%
```



Run 1: Report of SReAM — Data Link

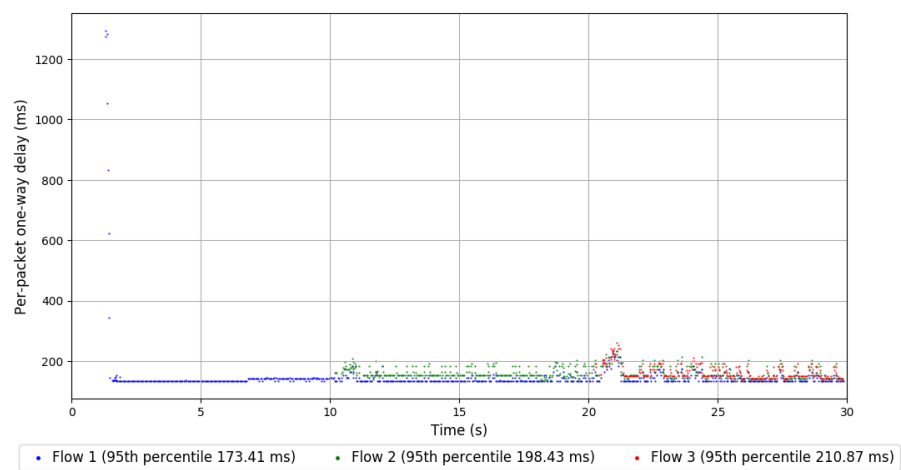
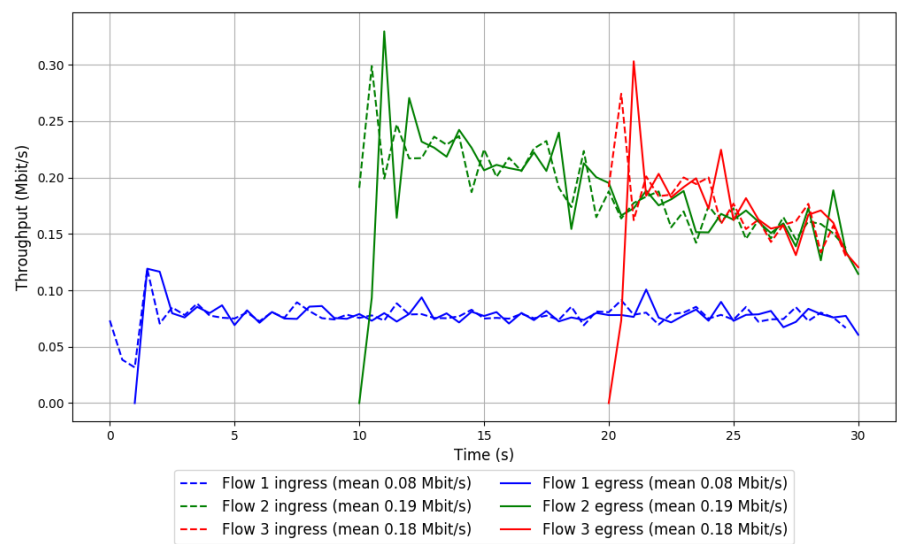


Run 2: Statistics of SReAM

Start at: 2018-08-10 00:24:20  
End at: 2018-08-10 00:24:50  
Local clock offset: -3.694 ms  
Remote clock offset: 3.153 ms

# Below is generated by plot.py at 2018-08-10 00:53:09  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.27 Mbit/s  
95th percentile per-packet one-way delay: 193.525 ms  
Loss rate: 1.14%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 173.405 ms  
Loss rate: 0.66%  
-- Flow 2:  
Average throughput: 0.19 Mbit/s  
95th percentile per-packet one-way delay: 198.434 ms  
Loss rate: 1.04%  
-- Flow 3:  
Average throughput: 0.18 Mbit/s  
95th percentile per-packet one-way delay: 210.871 ms  
Loss rate: 1.98%

Run 2: Report of SReAM — Data Link

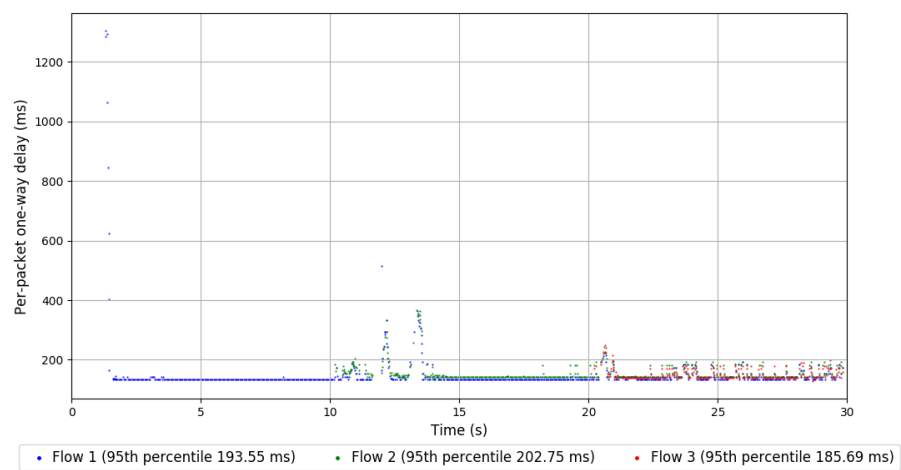
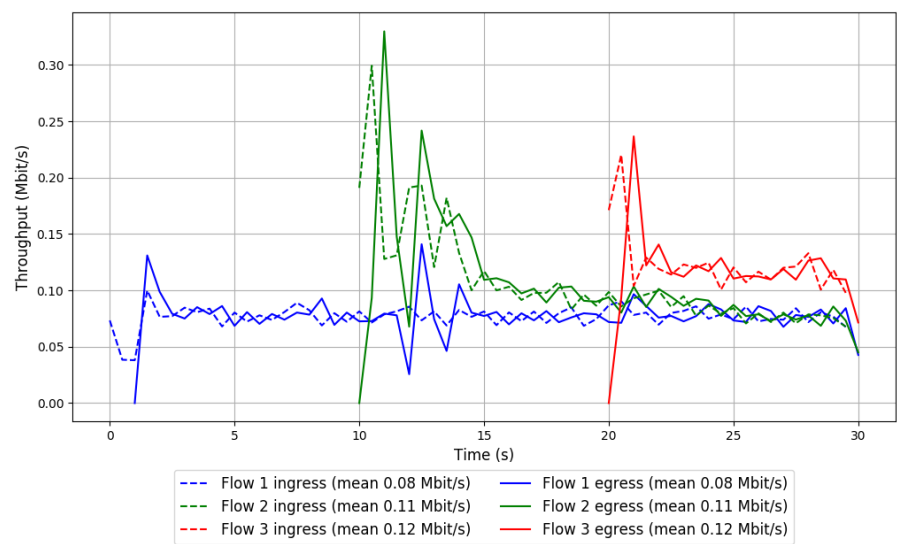


Run 3: Statistics of SReAM

Start at: 2018-08-10 00:44:47  
End at: 2018-08-10 00:45:17  
Local clock offset: -2.345 ms  
Remote clock offset: 6.555 ms

# Below is generated by plot.py at 2018-08-10 00:53:09  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.20 Mbit/s  
95th percentile per-packet one-way delay: 193.560 ms  
Loss rate: 1.31%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 193.554 ms  
Loss rate: 0.94%  
-- Flow 2:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 202.754 ms  
Loss rate: 1.03%  
-- Flow 3:  
Average throughput: 0.12 Mbit/s  
95th percentile per-packet one-way delay: 185.694 ms  
Loss rate: 2.49%

Run 3: Report of SCReAM — Data Link

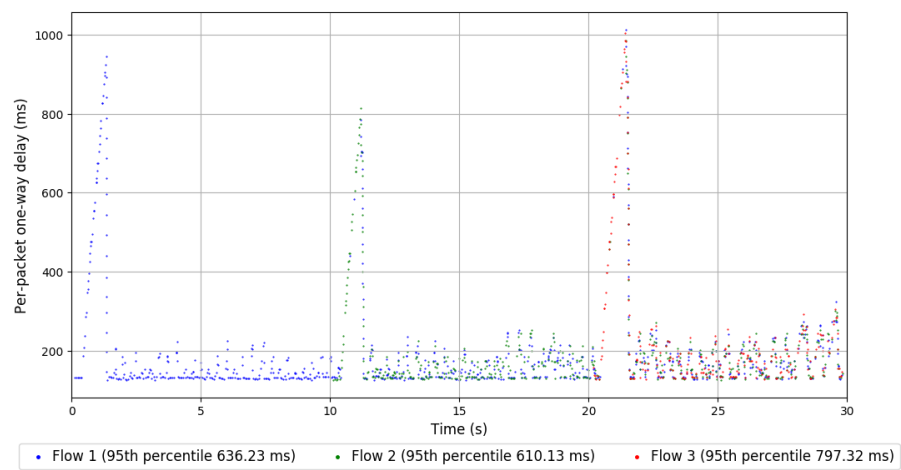
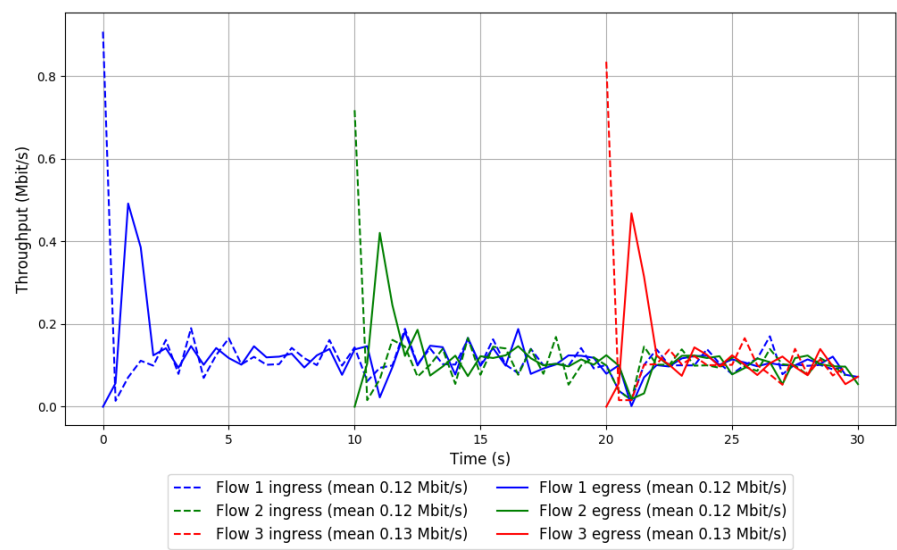


Run 1: Statistics of Sprout

Start at: 2018-08-10 00:08:45  
End at: 2018-08-10 00:09:15  
Local clock offset: -4.482 ms  
Remote clock offset: 7.295 ms

# Below is generated by plot.py at 2018-08-10 00:53:09  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.24 Mbit/s  
95th percentile per-packet one-way delay: 662.322 ms  
Loss rate: 1.39%  
-- Flow 1:  
Average throughput: 0.12 Mbit/s  
95th percentile per-packet one-way delay: 636.226 ms  
Loss rate: 0.94%  
-- Flow 2:  
Average throughput: 0.12 Mbit/s  
95th percentile per-packet one-way delay: 610.126 ms  
Loss rate: 1.47%  
-- Flow 3:  
Average throughput: 0.13 Mbit/s  
95th percentile per-packet one-way delay: 797.316 ms  
Loss rate: 2.49%

Run 1: Report of Sprout — Data Link



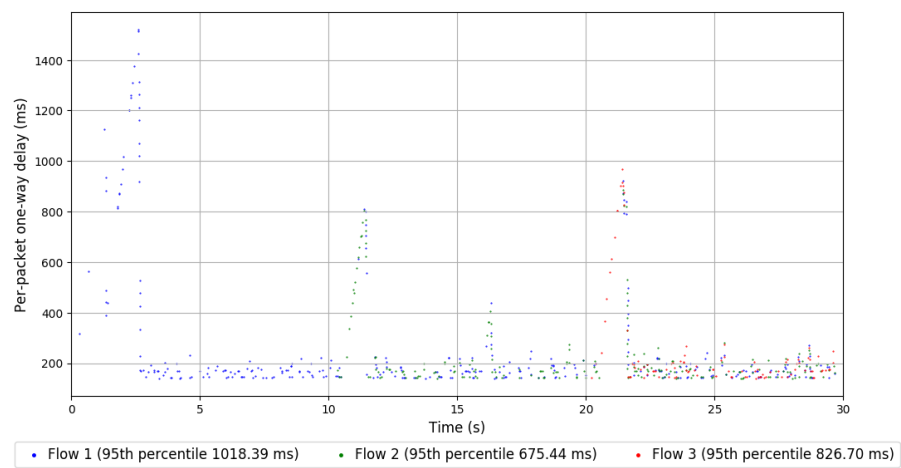
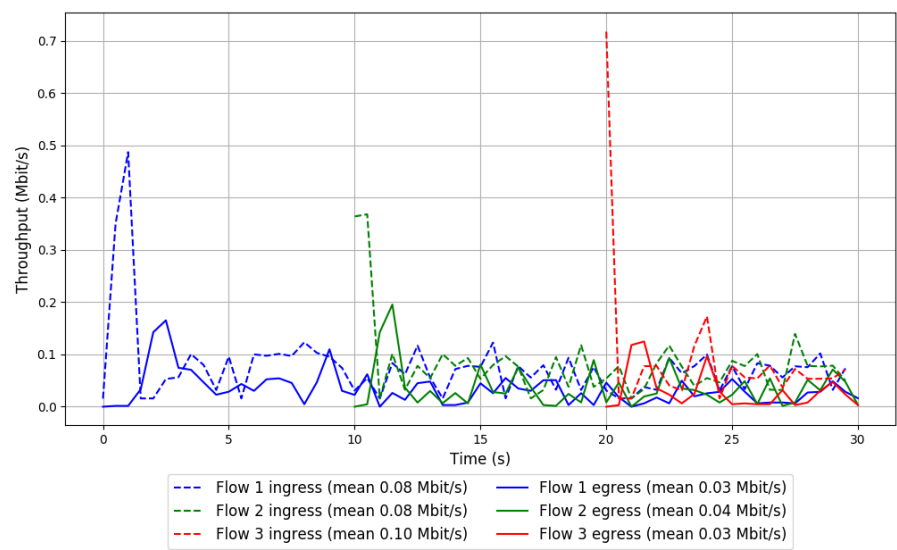
## Run 2: Statistics of Sprout

Start at: 2018-08-10 00:29:09  
End at: 2018-08-10 00:29:39  
Local clock offset: -2.715 ms  
Remote clock offset: 3.036 ms

```
# Below is generated by plot.py at 2018-08-10 00:53:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 868.745 ms
Loss rate: 57.48%
-- Flow 1:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 1018.390 ms
Loss rate: 55.12%
-- Flow 2:
Average throughput: 0.04 Mbit/s
95th percentile per-packet one-way delay: 675.439 ms
Loss rate: 55.38%
-- Flow 3:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 826.700 ms
Loss rate: 66.77%
```



Run 2: Report of Sprout — Data Link

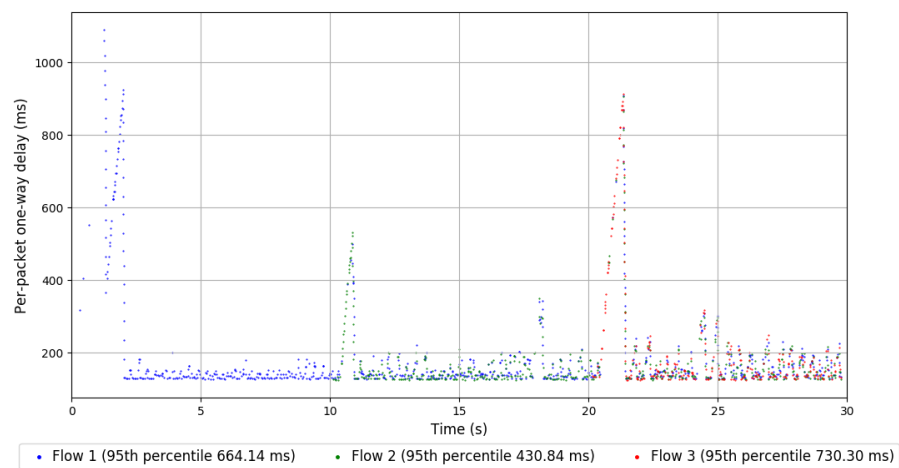
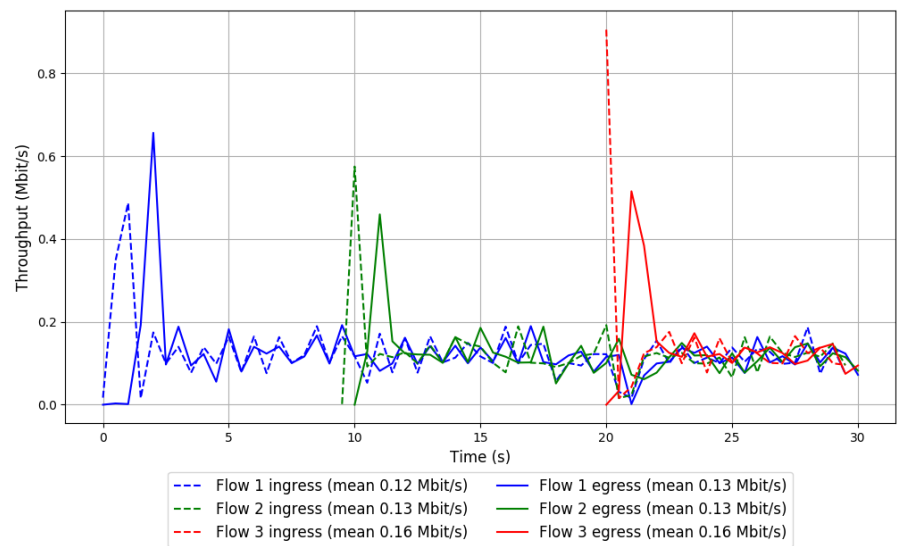


### Run 3: Statistics of Sprout

Start at: 2018-08-10 00:49:40  
End at: 2018-08-10 00:50:10  
Local clock offset: -2.551 ms  
Remote clock offset: 7.638 ms

```
# Below is generated by plot.py at 2018-08-10 00:53:09
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.26 Mbit/s
95th percentile per-packet one-way delay: 623.739 ms
Loss rate: 1.33%
-- Flow 1:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 664.140 ms
Loss rate: 0.62%
-- Flow 2:
Average throughput: 0.13 Mbit/s
95th percentile per-packet one-way delay: 430.842 ms
Loss rate: 1.79%
-- Flow 3:
Average throughput: 0.16 Mbit/s
95th percentile per-packet one-way delay: 730.305 ms
Loss rate: 2.29%
```

Run 3: Report of Sprout — Data Link



Run 1: Statistics of TaoVA-100x

Start at: 2018-08-10 00:11:09

End at: 2018-08-10 00:11:39

Local clock offset: -4.371 ms

Remote clock offset: 8.476 ms

# Below is generated by plot.py at 2018-08-10 00:53:09

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 5609.980 ms

Loss rate: 14.38%

-- Flow 1:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 4799.856 ms

Loss rate: 4.77%

-- Flow 2:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 5708.352 ms

Loss rate: 12.46%

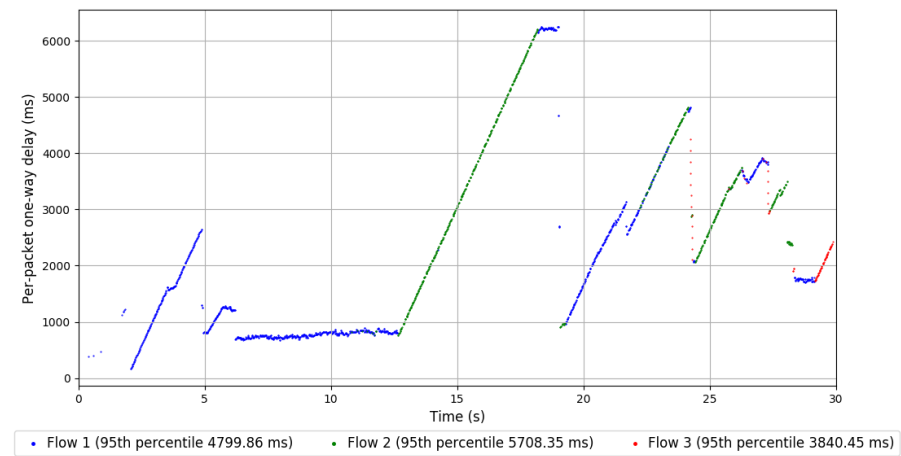
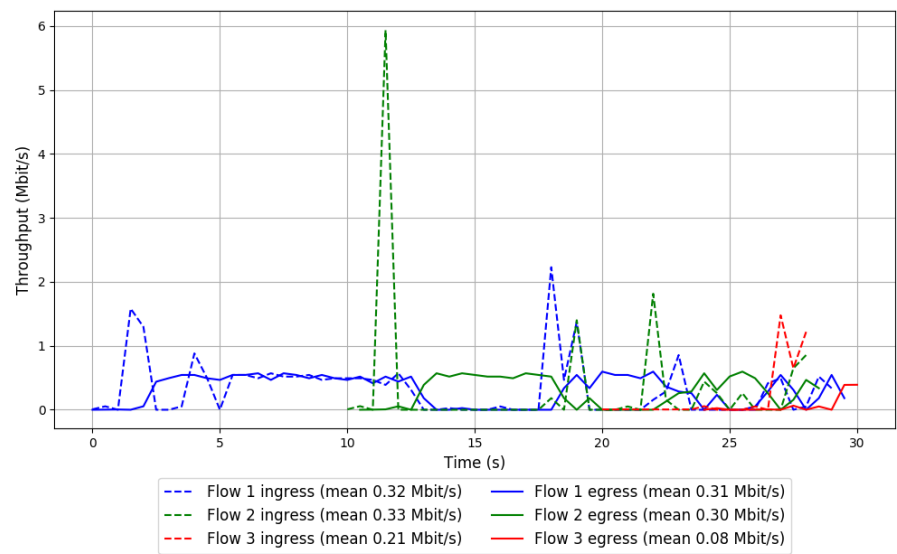
-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 3840.445 ms

Loss rate: 73.42%

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



Run 2: Statistics of TaoVA-100x

Start at: 2018-08-10 00:31:33

End at: 2018-08-10 00:32:03

Local clock offset: -2.682 ms

Remote clock offset: 1.872 ms

# Below is generated by plot.py at 2018-08-10 00:53:10

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.47 Mbit/s

95th percentile per-packet one-way delay: 4113.647 ms

Loss rate: 12.72%

-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 3509.472 ms

Loss rate: 12.20%

-- Flow 2:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 3760.624 ms

Loss rate: 10.07%

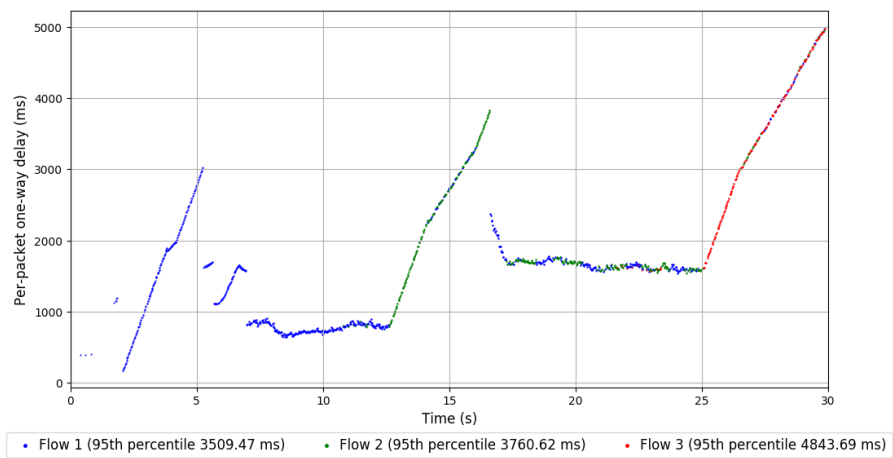
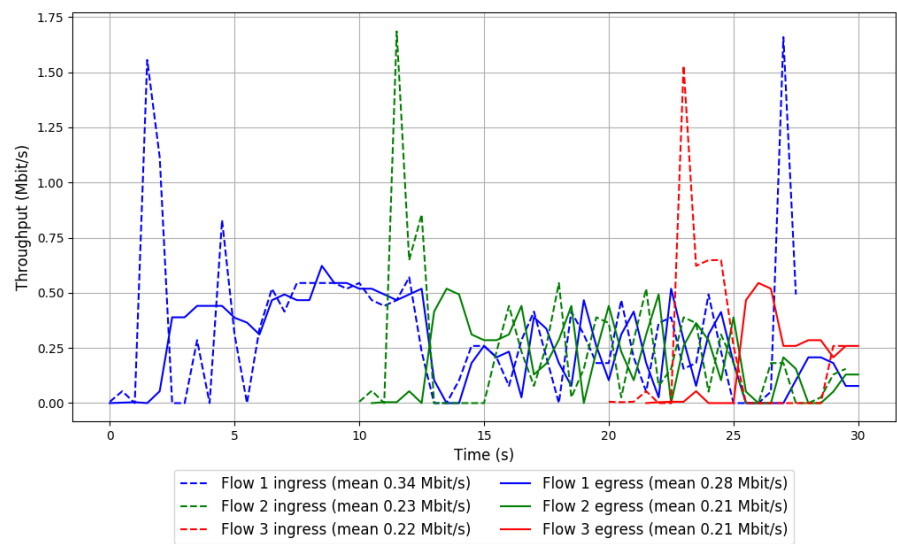
-- Flow 3:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 4843.693 ms

Loss rate: 20.52%

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



Run 3: Statistics of TaoVA-100x

Start at: 2018-08-10 00:52:04

End at: 2018-08-10 00:52:34

Local clock offset: -2.654 ms

Remote clock offset: 7.761 ms

# Below is generated by plot.py at 2018-08-10 00:53:11

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.50 Mbit/s

95th percentile per-packet one-way delay: 3910.481 ms

Loss rate: 9.68%

-- Flow 1:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 2945.730 ms

Loss rate: 4.72%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 3676.207 ms

Loss rate: 9.68%

-- Flow 3:

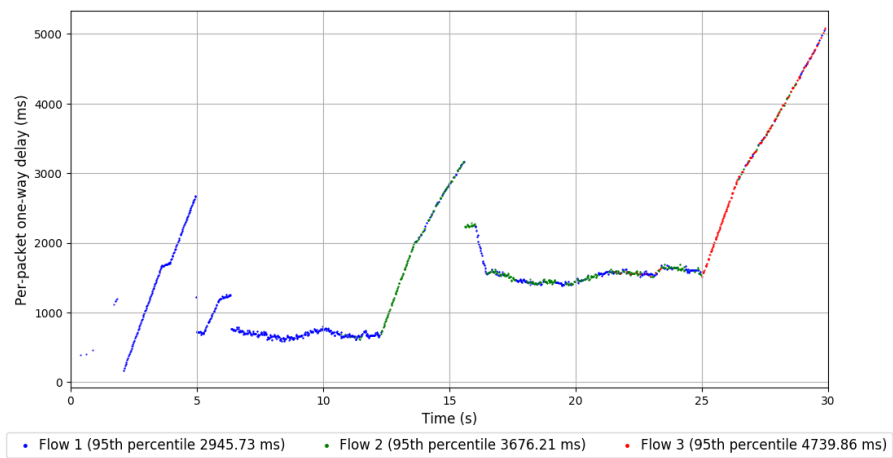
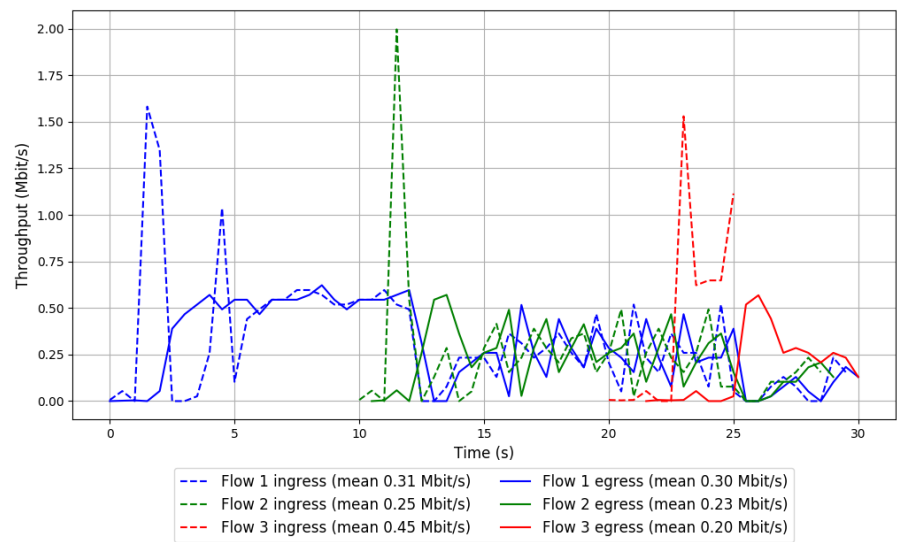
Average throughput: 0.20 Mbit/s

95th percentile per-packet one-way delay: 4739.860 ms

Loss rate: 29.66%



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



Run 1: Statistics of TCP Vegas

Start at: 2018-08-10 00:00:11

End at: 2018-08-10 00:00:41

Local clock offset: -3.78 ms

Remote clock offset: 3.571 ms

# Below is generated by plot.py at 2018-08-10 00:53:11

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.45 Mbit/s

95th percentile per-packet one-way delay: 1960.110 ms

Loss rate: 5.63%

-- Flow 1:

Average throughput: 0.28 Mbit/s

95th percentile per-packet one-way delay: 1600.592 ms

Loss rate: 2.18%

-- Flow 2:

Average throughput: 0.21 Mbit/s

95th percentile per-packet one-way delay: 2000.196 ms

Loss rate: 6.44%

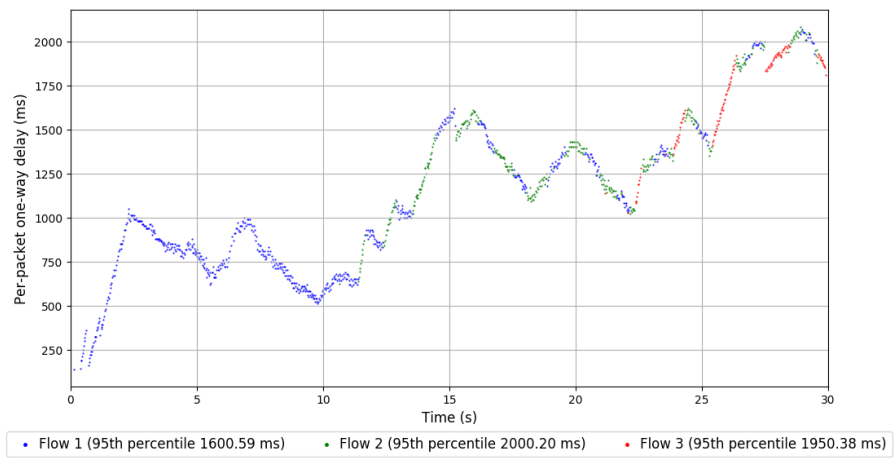
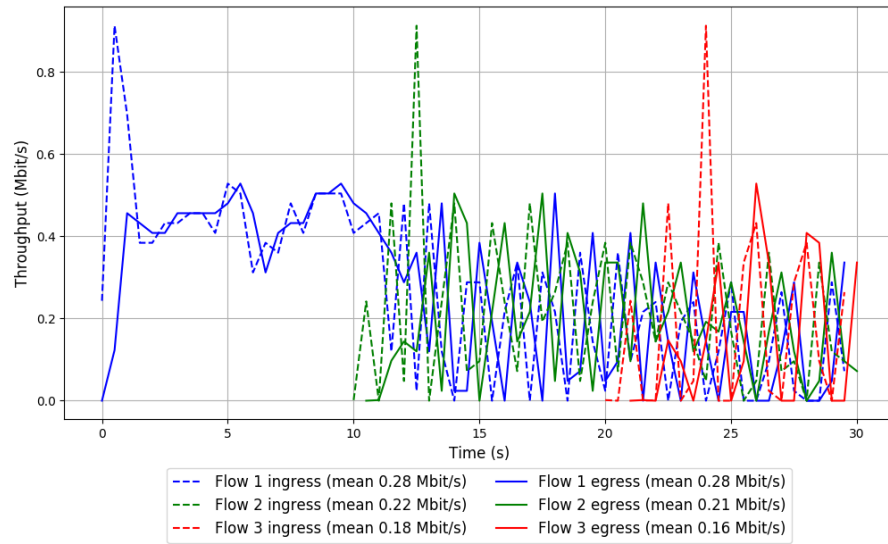
-- Flow 3:

Average throughput: 0.16 Mbit/s

95th percentile per-packet one-way delay: 1950.378 ms

Loss rate: 19.83%

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2018-08-10 00:20:45

End at: 2018-08-10 00:21:15

Local clock offset: -2.375 ms

Remote clock offset: 7.035 ms

# Below is generated by plot.py at 2018-08-10 00:53:11

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.51 Mbit/s

95th percentile per-packet one-way delay: 1537.936 ms

Loss rate: 4.30%

-- Flow 1:

Average throughput: 0.30 Mbit/s

95th percentile per-packet one-way delay: 1354.316 ms

Loss rate: 1.47%

-- Flow 2:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 1555.494 ms

Loss rate: 4.18%

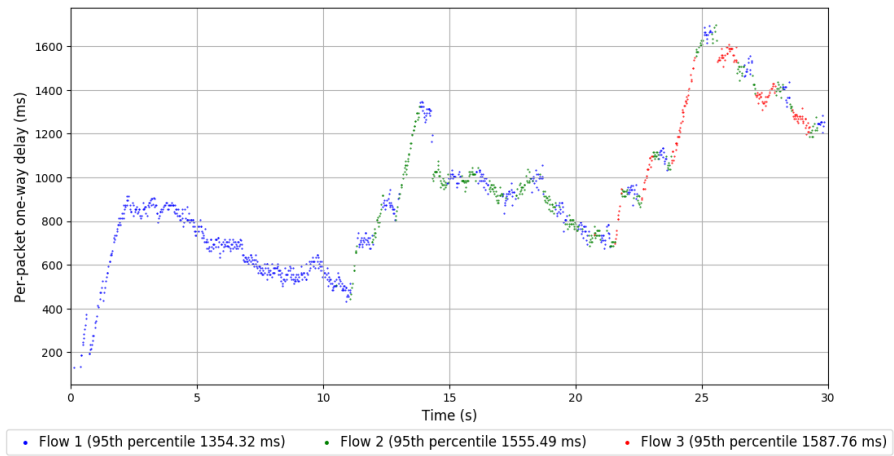
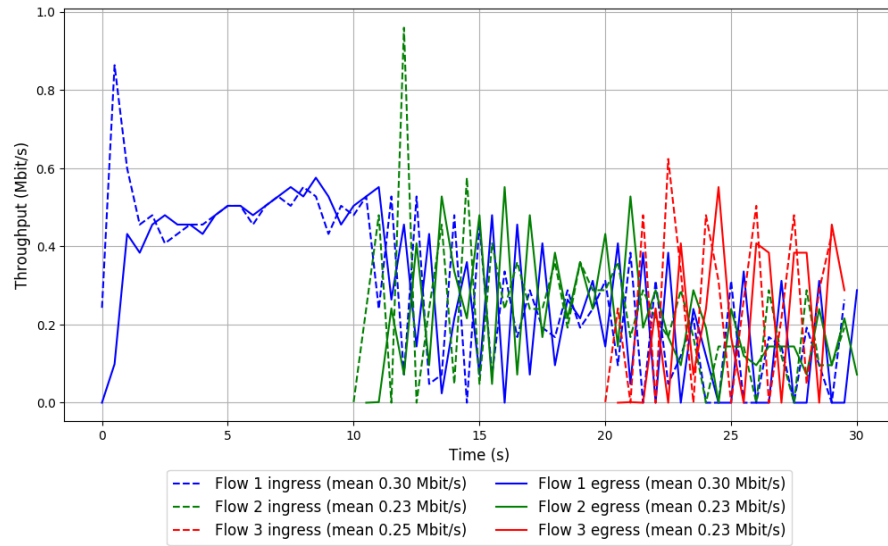
-- Flow 3:

Average throughput: 0.23 Mbit/s

95th percentile per-packet one-way delay: 1587.760 ms

Loss rate: 15.30%

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



Run 3: Statistics of TCP Vegas

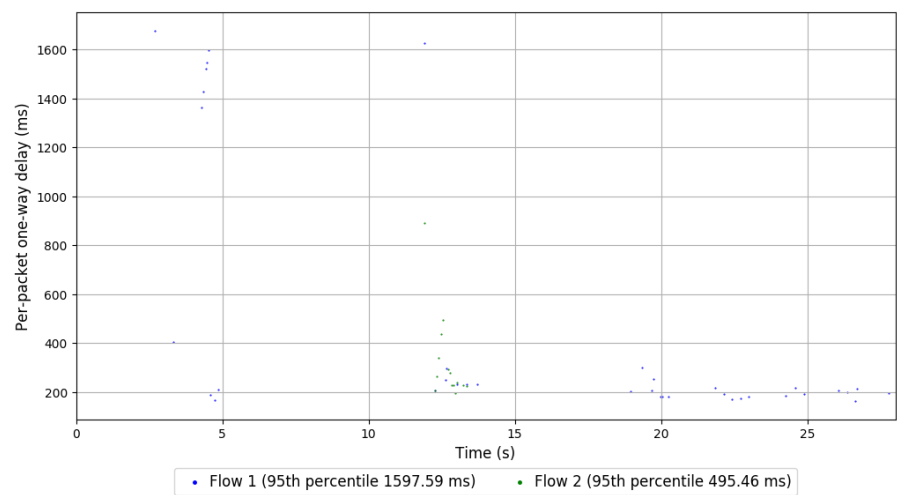
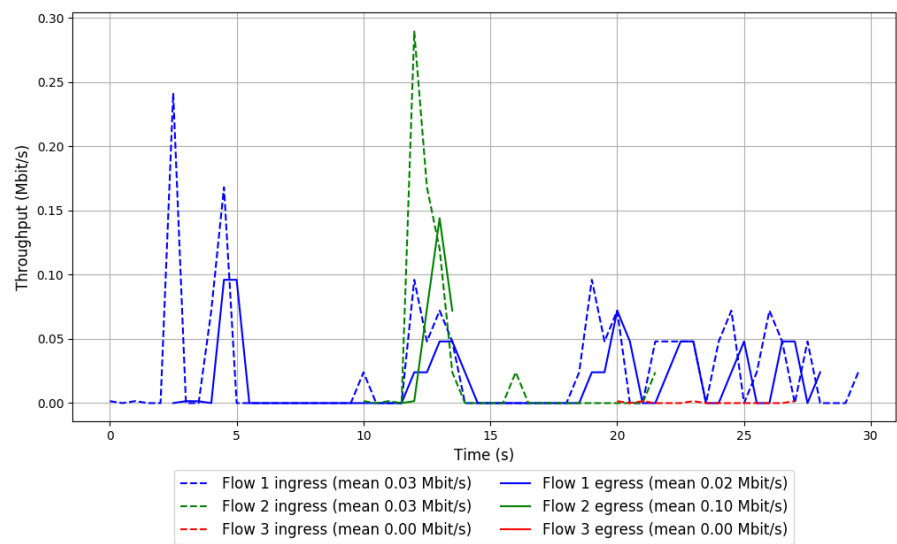
Start at: 2018-08-10 00:41:12

End at: 2018-08-10 00:41:42

Local clock offset: -3.247 ms

Remote clock offset: 1.758 ms

Run 3: Report of TCP Vegas — Data Link



Run 1: Statistics of Verus

Start at: 2018-08-10 00:01:22

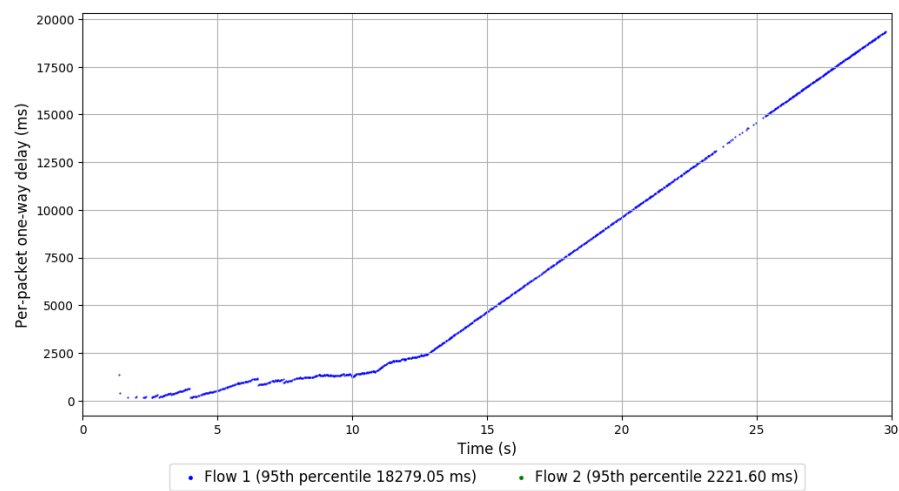
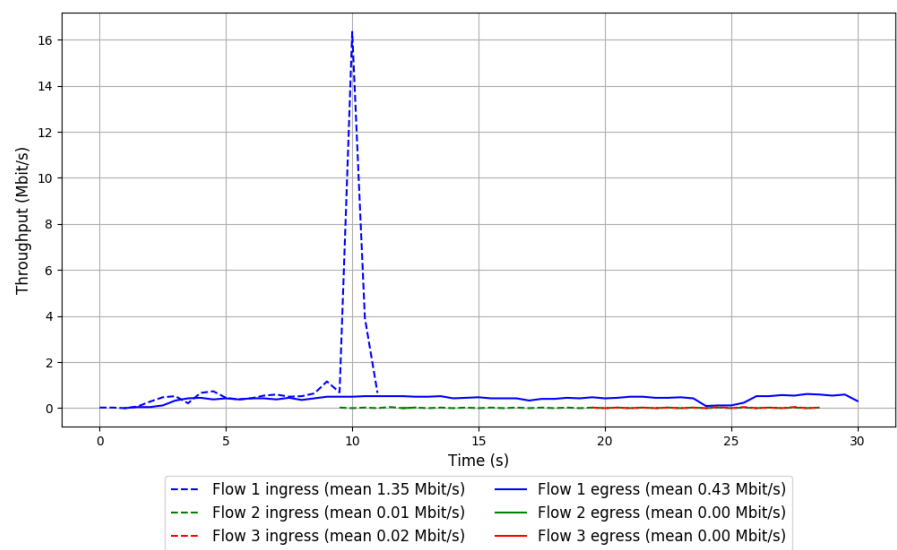
End at: 2018-08-10 00:01:52

Local clock offset: -2.973 ms

Remote clock offset: 2.572 ms



Run 1: Report of Verus — Data Link

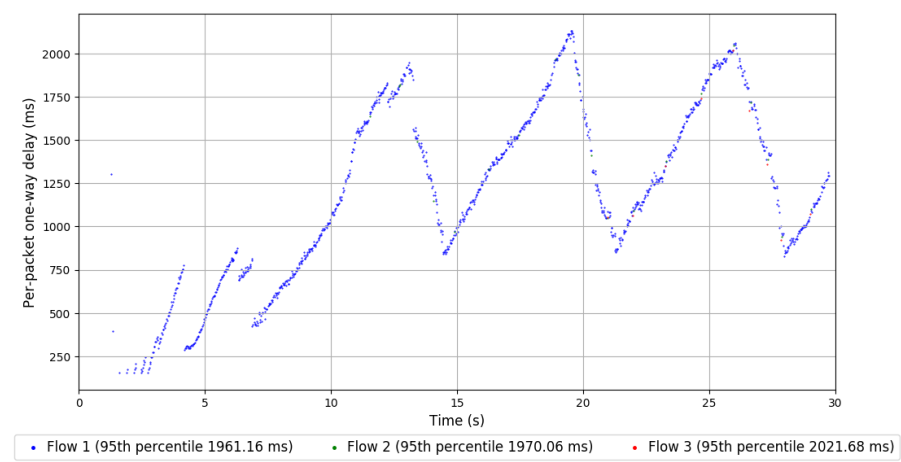
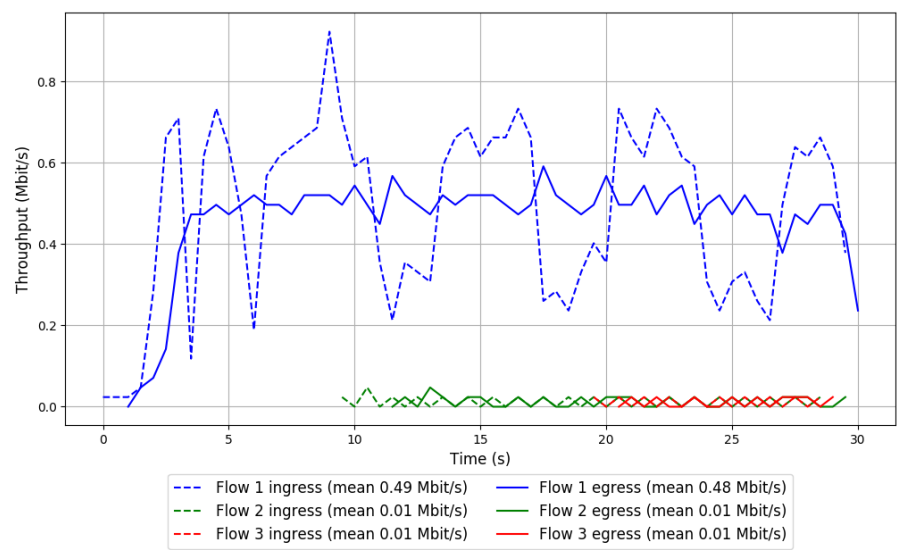


Run 2: Statistics of Verus

Start at: 2018-08-10 00:21:57  
End at: 2018-08-10 00:22:27  
Local clock offset: -3.058 ms  
Remote clock offset: 5.918 ms

# Below is generated by plot.py at 2018-08-10 00:53:14  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.49 Mbit/s  
95th percentile per-packet one-way delay: 1962.366 ms  
Loss rate: 5.74%  
-- Flow 1:  
Average throughput: 0.48 Mbit/s  
95th percentile per-packet one-way delay: 1961.160 ms  
Loss rate: 5.72%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 1970.061 ms  
Loss rate: 4.76%  
-- Flow 3:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 2021.679 ms  
Loss rate: 10.00%

Run 2: Report of Verus — Data Link

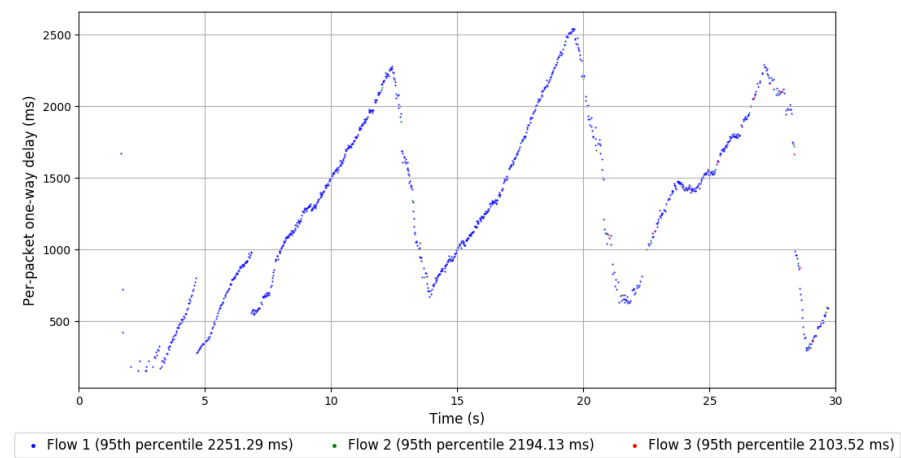
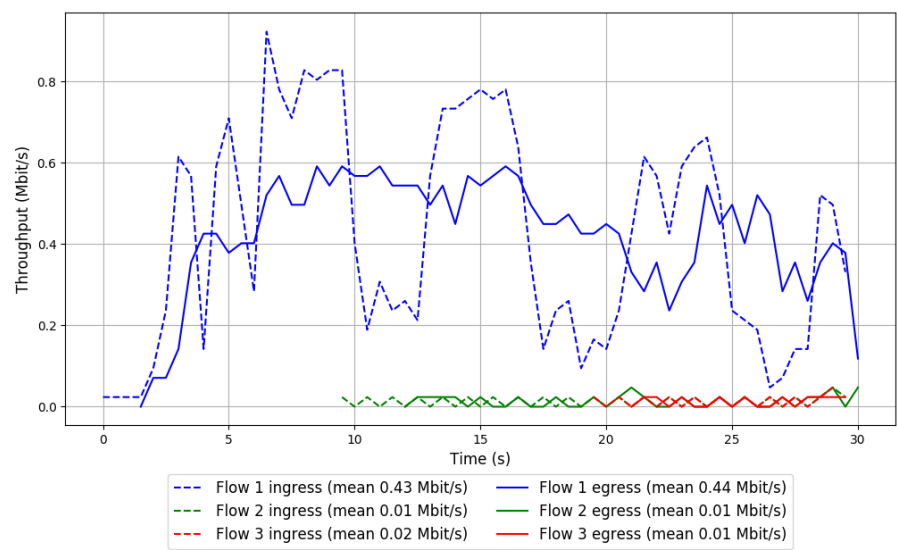


Run 3: Statistics of Verus

Start at: 2018-08-10 00:42:24  
End at: 2018-08-10 00:42:54  
Local clock offset: -3.229 ms  
Remote clock offset: 6.538 ms

# Below is generated by plot.py at 2018-08-10 00:53:14  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.45 Mbit/s  
95th percentile per-packet one-way delay: 2249.621 ms  
Loss rate: 2.89%  
-- Flow 1:  
Average throughput: 0.44 Mbit/s  
95th percentile per-packet one-way delay: 2251.292 ms  
Loss rate: 2.71%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 2194.127 ms  
Loss rate: 4.35%  
-- Flow 3:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 2103.517 ms  
Loss rate: 16.67%

Run 3: Report of Verus — Data Link



Run 1: Statistics of PCC-Vivace

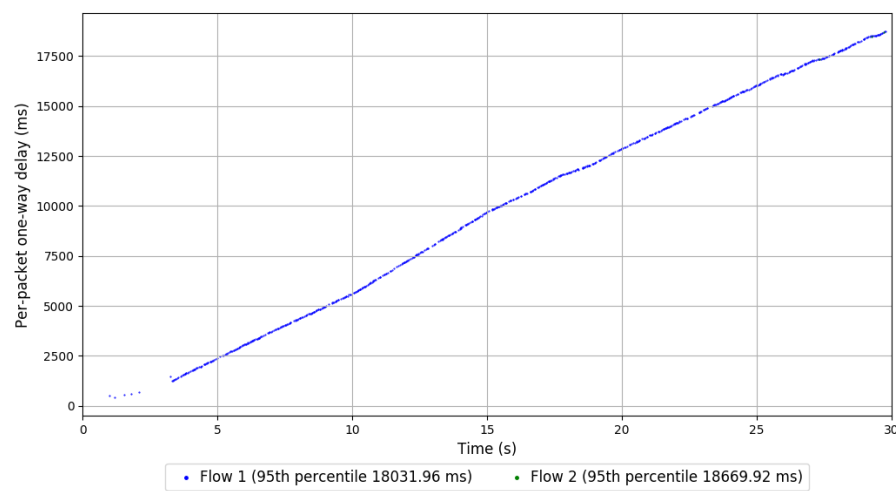
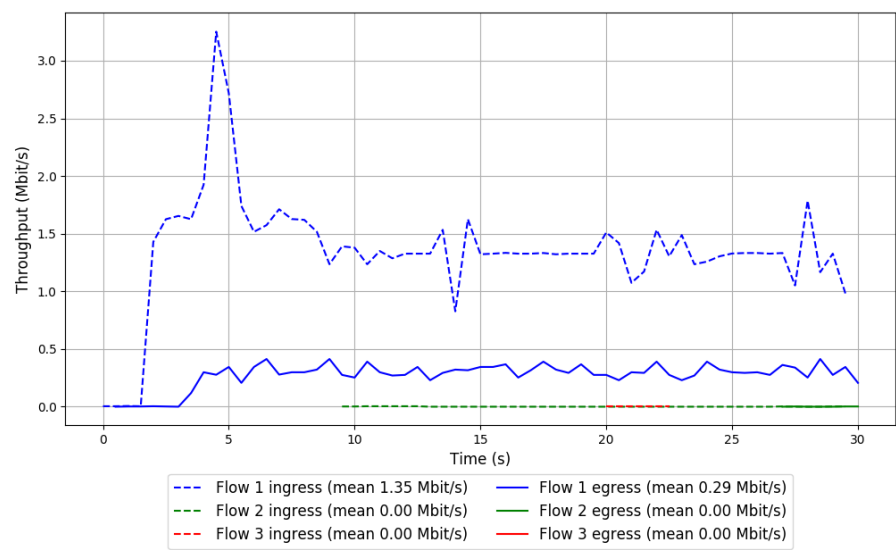
Start at: 2018-08-09 23:51:39

End at: 2018-08-09 23:52:09

Local clock offset: -3.336 ms

Remote clock offset: 7.286 ms

Run 1: Report of PCC-Vivace — Data Link



Run 2: Statistics of PCC-Vivace

Start at: 2018-08-10 00:12:21

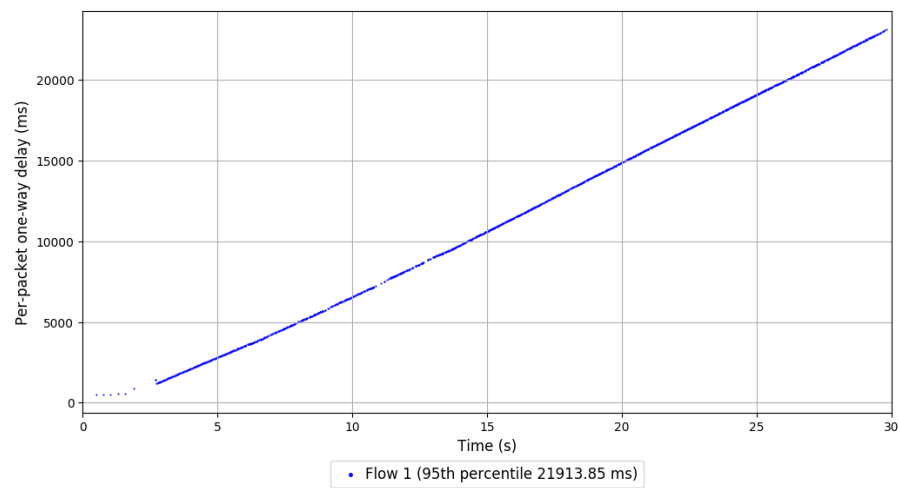
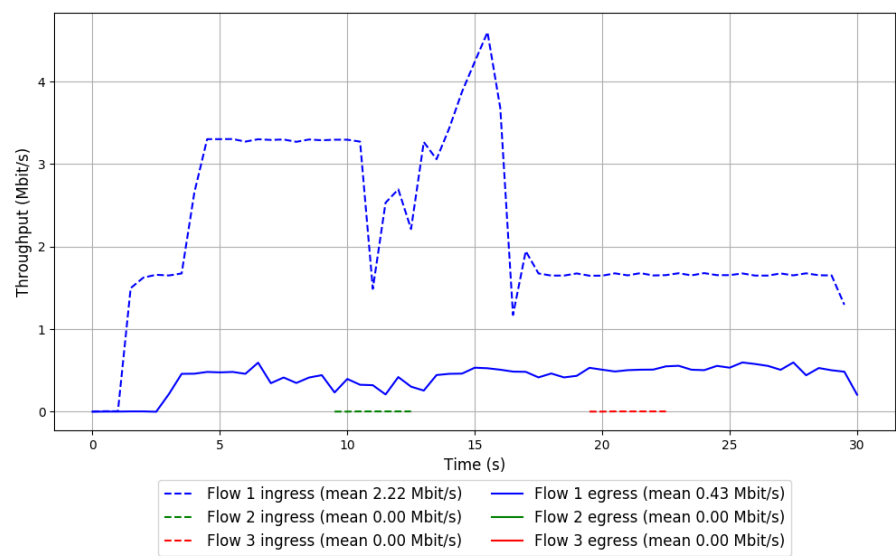
End at: 2018-08-10 00:12:51

Local clock offset: -2.837 ms

Remote clock offset: 3.67 ms



Run 2: Report of PCC-Vivace — Data Link



Run 3: Statistics of PCC-Vivace

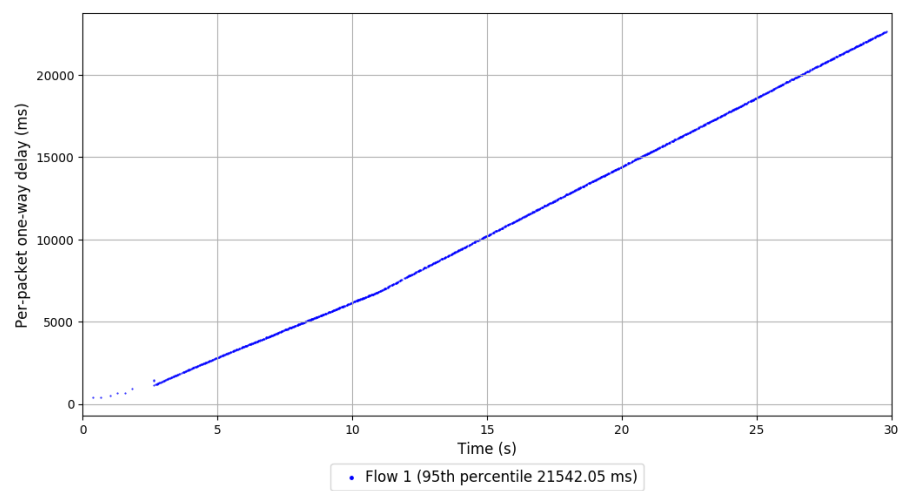
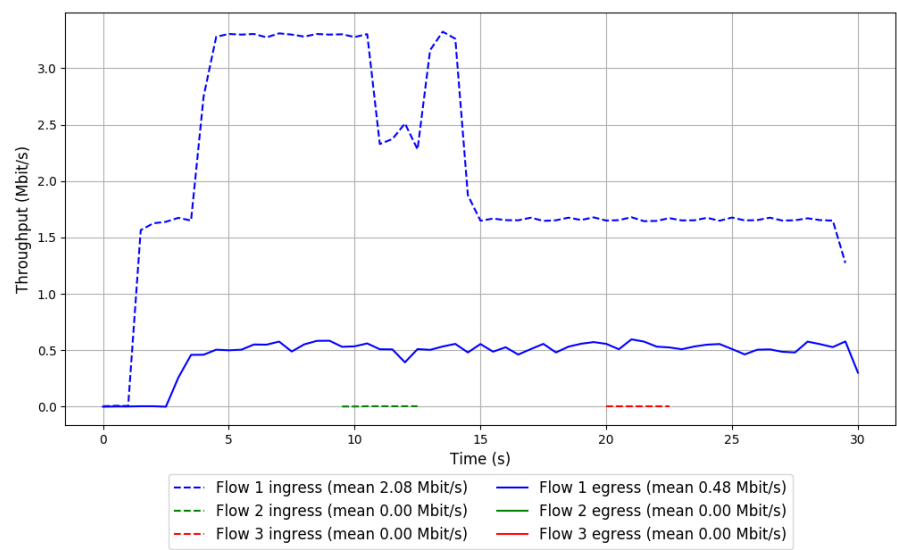
Start at: 2018-08-10 00:32:45

End at: 2018-08-10 00:33:15

Local clock offset: -3.355 ms

Remote clock offset: 2.871 ms

Run 3: Report of PCC-Vivace — Data Link



Run 1: Statistics of WebRTC media

Start at: 2018-08-10 00:09:57

End at: 2018-08-10 00:10:27

Local clock offset: -3.637 ms

Remote clock offset: 8.446 ms

# Below is generated by plot.py at 2018-08-10 00:53:16

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.31 Mbit/s

95th percentile per-packet one-way delay: 2038.081 ms

Loss rate: 1.89%

-- Flow 1:

Average throughput: 0.15 Mbit/s

95th percentile per-packet one-way delay: 2171.663 ms

Loss rate: 0.30%

-- Flow 2:

Average throughput: 0.12 Mbit/s

95th percentile per-packet one-way delay: 1945.508 ms

Loss rate: 0.51%

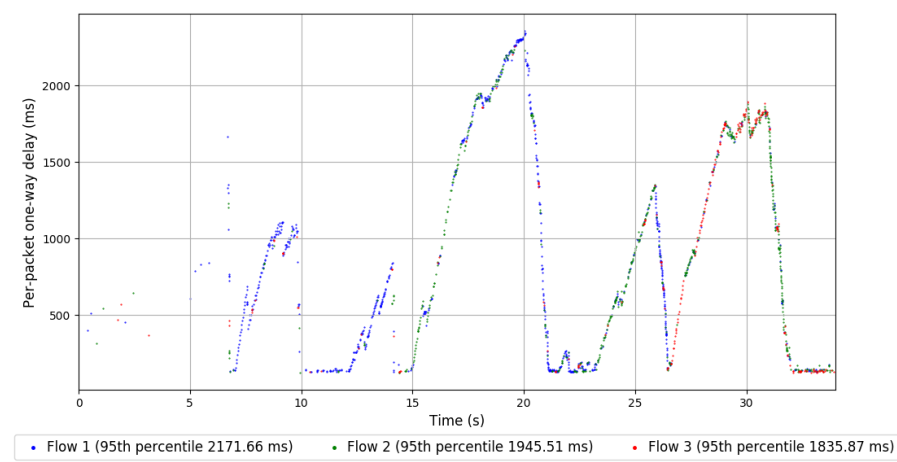
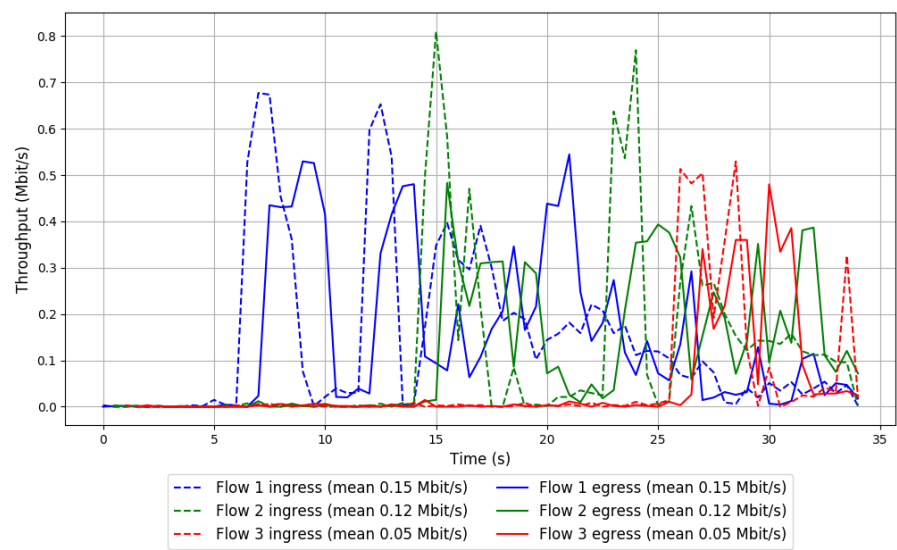
-- Flow 3:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 1835.872 ms

Loss rate: 9.83%

Run 1: Report of WebRTC media — Data Link



Run 2: Statistics of WebRTC media

Start at: 2018-08-10 00:30:22

End at: 2018-08-10 00:30:52

Local clock offset: -3.504 ms

Remote clock offset: 6.723 ms

# Below is generated by plot.py at 2018-08-10 00:53:16

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 604.053 ms

Loss rate: 58.75%

-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1219.144 ms

Loss rate: 58.35%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 599.476 ms

Loss rate: 59.42%

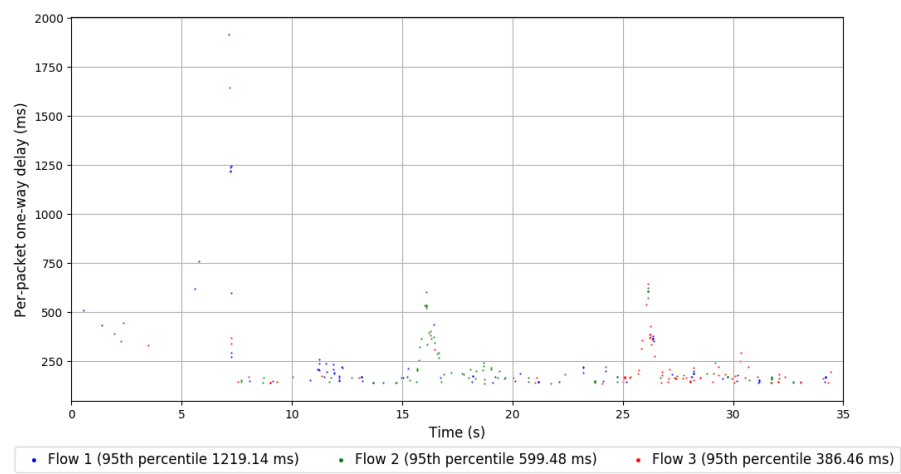
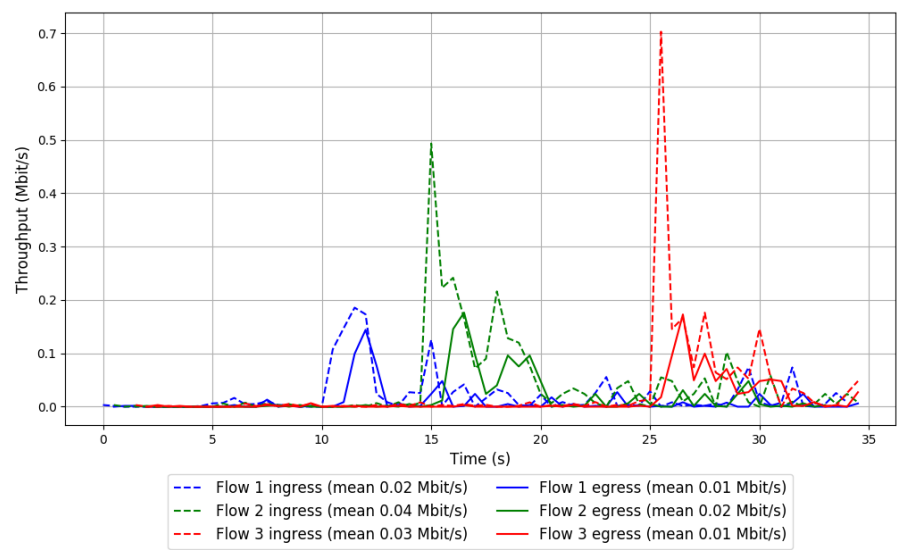
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 386.462 ms

Loss rate: 58.16%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

Start at: 2018-08-10 00:50:52

End at: 2018-08-10 00:51:22

Local clock offset: -2.593 ms

Remote clock offset: 2.852 ms

# Below is generated by plot.py at 2018-08-10 00:53:16

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.33 Mbit/s

95th percentile per-packet one-way delay: 1426.038 ms

Loss rate: 0.87%

-- Flow 1:

Average throughput: 0.14 Mbit/s

95th percentile per-packet one-way delay: 1443.293 ms

Loss rate: 0.21%

-- Flow 2:

Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 1424.900 ms

Loss rate: 0.03%

-- Flow 3:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 1315.380 ms

Loss rate: 3.08%



Run 3: Report of WebRTC media — Data Link

