

## Pantheon Report

Generated at 2017-09-22 15:30:21 (UTC).

Data path: AWS California 2 Ethernet (*local*) → Mexico ppp0 (*remote*).

Repeated the test of 14 congestion control schemes 3 times.

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

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

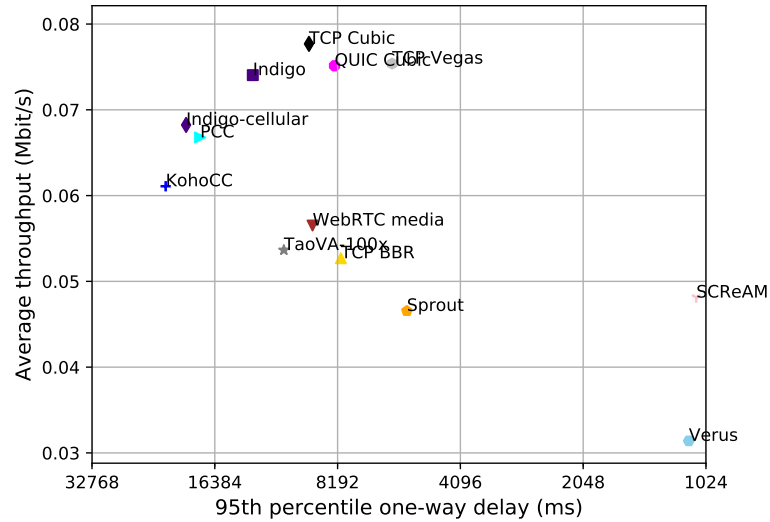
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

NTP offsets were measured against `time.stanford.edu` and have been applied to correct the timestamps in logs.

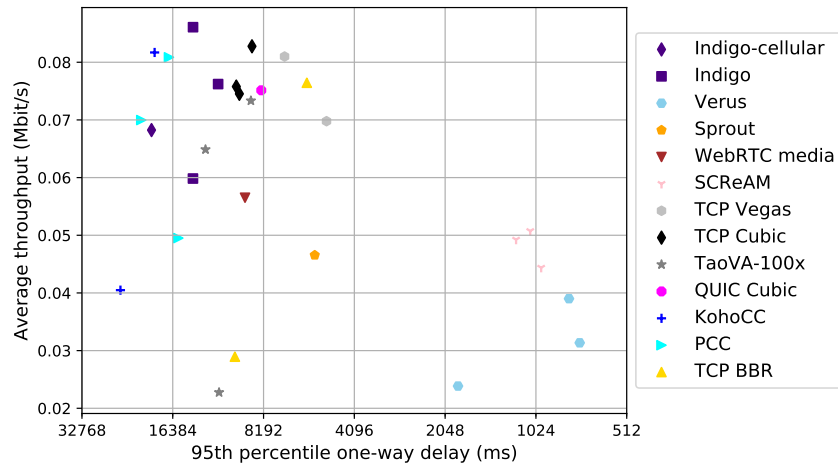
Git summary:

```
branch: indigos @ 46c7c812d4acb71eea4f5fb0b03b3657cea3062f
third_party/calibrated_koho @ 3cb73c0d1c0322cdfae446ea37a522e53227db50
  M datagrump/sender.cc
third_party/genericCC @ f7ca42f251bf49b432bb71de6d13fa903515c366
third_party/indigo @ b19f3730105f9aa95452552af924e3719b03cc55
third_party/indigo-cellular @ aee99e8eb842cb053f8c9a80e28cd256a930bbc2
third_party/indigo-no-calib @ 7224f2202e8a044d8306fa0b983ad84360c53d89
third_party/indigo-no-cwnd @ 3e58442c04028a11d7b02456e137604633ba2d6c
third_party/indigo-no-delivery-rate @ 57caa40858b964906edff4876d5a7e5bfff666c5
third_party/indigo-no-queuing-delay @ 03455460fd1a8ffbdad86fabb936fdca204b80db
third_party/indigo-no-send-rate @ b39dfa6b2c5f19cb7cd89626cb4f5bb81f9fecda
third_party/koho_cc @ f0f2e693303aee82ea808e6928eac4f1083a6681
  M datagrump/sender.cc
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/pantheon-tunnel @ baf443516dea3eeddeccaf9b916cc313273ca4f4
third_party/pcc @ 1afc958fa0d66d18b623c091a55fec872b4981e1
  M receiver/src/buffer.h
  M receiver/src/core.cpp
  M sender/src/buffer.h
  M sender/src/core.cpp
third_party/proto-quic @ 77961f1a82733a86b42f1bc8143ebc978f3cff42
third_party/scream @ c3370fd7bd17265a79aeb34e4016ad23f5965885
third_party/sourdough @ f1a14bffe749737437f61b1eaeeb30b267cde681
third_party/sprout @ 6f2efe6e088d91066a9f023df375eee2665089ce
  M src/examples/cellsim.cc
  M src/examples/sproutbt2.cc
  M src/network/sproutconn.cc
third_party/verus @ d4b447ea74c6c60a261149af2629562939f9a494
  M src/verus.hpp
  M tools/plot.py
third_party/webrtc @ a488197ddd041ace68a42849b2540ad834825f42
```

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



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



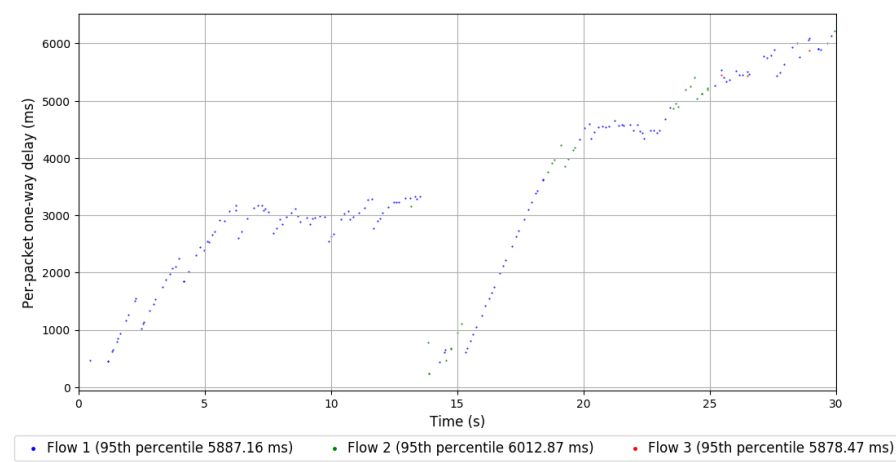
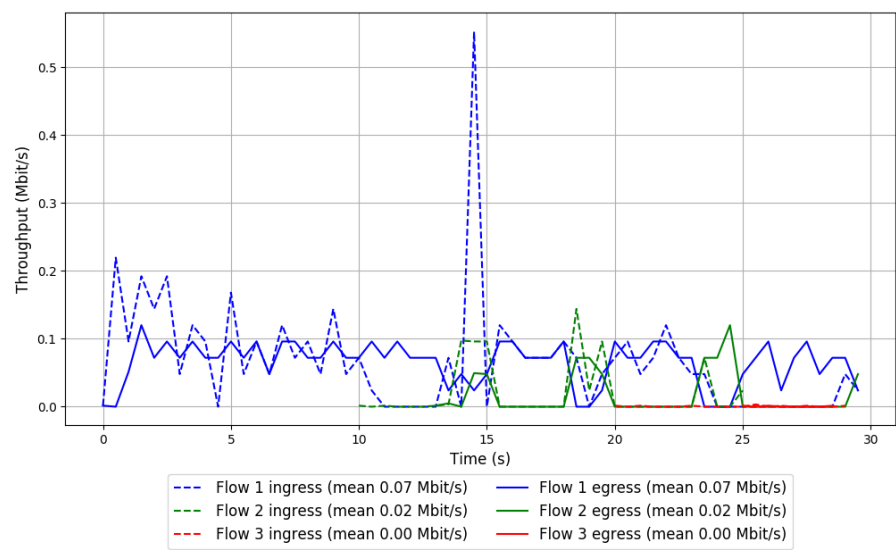
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	2	0.05	0.02	0.00	8062.53	8064.00	5878.47	10.50	10.35	62.30
TCP Cubic	3	0.07	0.01	0.00	9629.67	9158.32	8948.15	27.91	72.85	67.79
LEDBAT	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PCC	3	0.05	0.04	0.00	15366.38	16032.60	N/A	77.91	84.41	N/A
QUIC Cubic	1	0.07	0.00	0.00	8335.33	8238.19	6994.05	26.69	0.00	16.67
SCReAM	3	0.03	0.02	0.03	958.16	1030.86	1287.79	0.55	0.93	1.83
WebRTC media	1	0.05	0.00	0.00	9243.95	9522.65	9252.58	0.59	54.41	22.32
Sprout	1	0.02	0.02	0.04	4001.98	5537.45	5611.89	11.59	18.73	25.25
TaoVA-100x	3	0.05	0.03	0.04	9571.67	9120.86	7165.91	69.00	97.10	83.33
TCP Vegas	2	0.05	0.04	0.01	6148.83	5439.94	5453.67	6.34	17.45	61.55
Verus	3	0.02	0.02	0.02	1085.56	1002.56	1187.36	1.85	5.14	4.70
Indigo	3	0.04	0.06	0.00	10595.92	14180.91	N/A	13.29	42.20	N/A
Indigo-cellular	1	0.07	0.00	N/A	19266.44	N/A	N/A	68.26	N/A	N/A
KohoCC	2	0.06	0.04	0.00	20445.36	19856.10	N/A	74.03	95.80	N/A

Run 1: Statistics of TCP BBR

Start at: 2017-09-22 14:40:29  
End at: 2017-09-22 14:40:59  
Local clock offset: 0.164 ms  
Remote clock offset: -0.088 ms

# Below is generated by plot.py at 2017-09-22 15:29:57  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 5887.156 ms  
Loss rate: 3.78%  
-- Flow 1:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 5887.156 ms  
Loss rate: 2.99%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 6012.866 ms  
Loss rate: 7.54%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 5878.469 ms  
Loss rate: 62.30%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

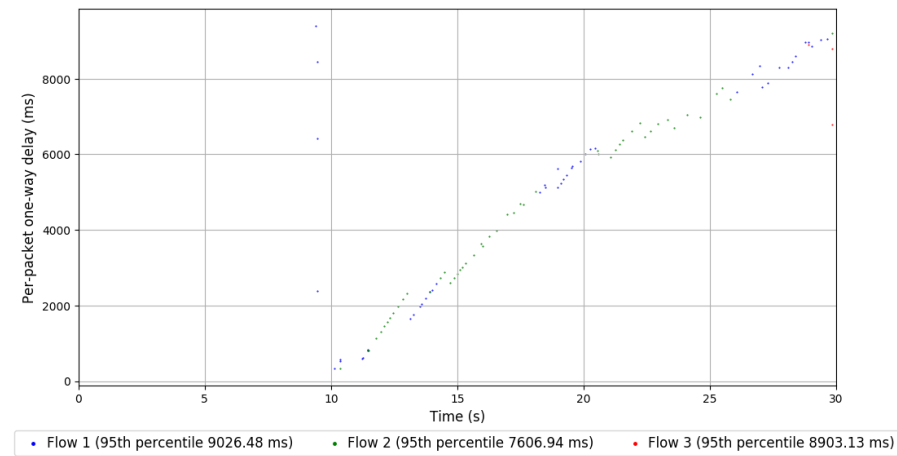
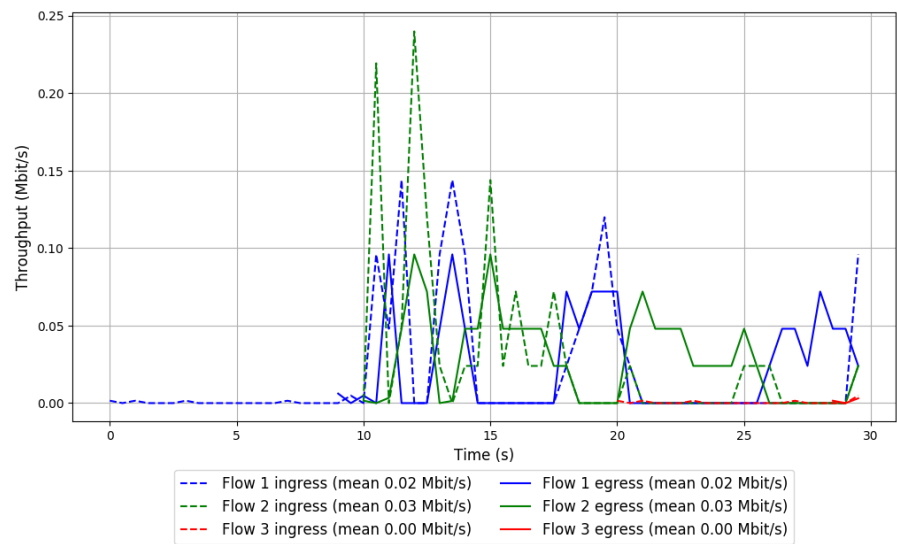
Start at: 2017-09-22 15:00:26

End at: 2017-09-22 15:00:56

Local clock offset: 0.102 ms

Remote clock offset: 0.542 ms

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2017-09-22 15:20:23

End at: 2017-09-22 15:20:53

Local clock offset: 0.153 ms

Remote clock offset: 0.141 ms

# Below is generated by plot.py at 2017-09-22 15:29:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 10195.773 ms

Loss rate: 16.32%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 10237.904 ms

Loss rate: 18.00%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 10115.125 ms

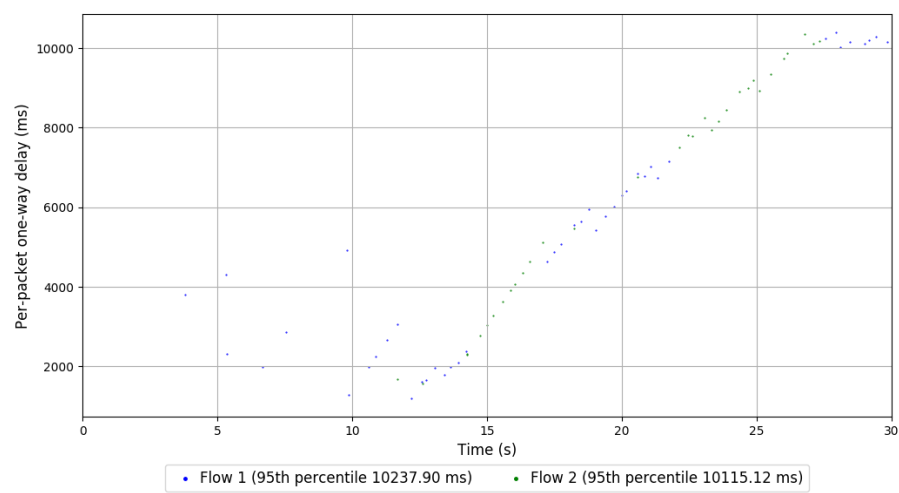
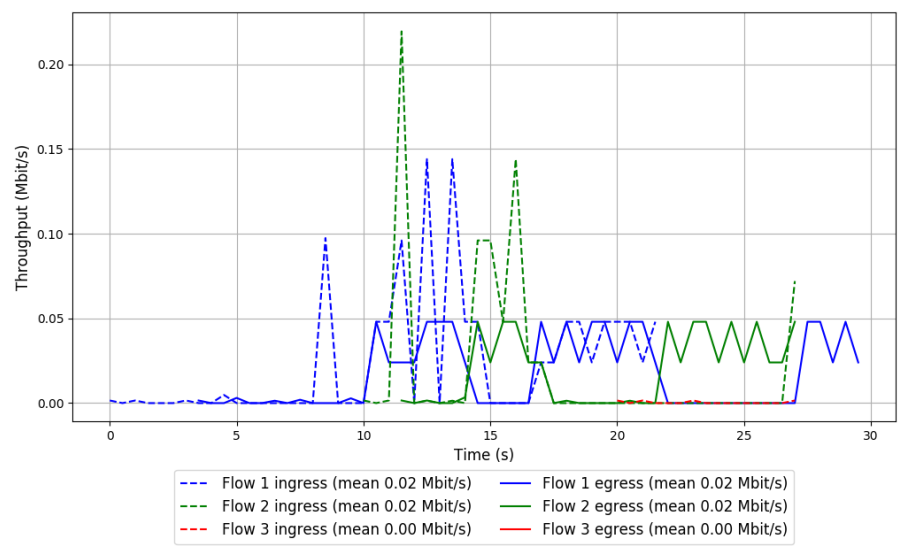
Loss rate: 13.16%

-- Flow 3:

Average throughput: 0.00 Mbit/s



Run 3: Report of TCP BBR — Data Link

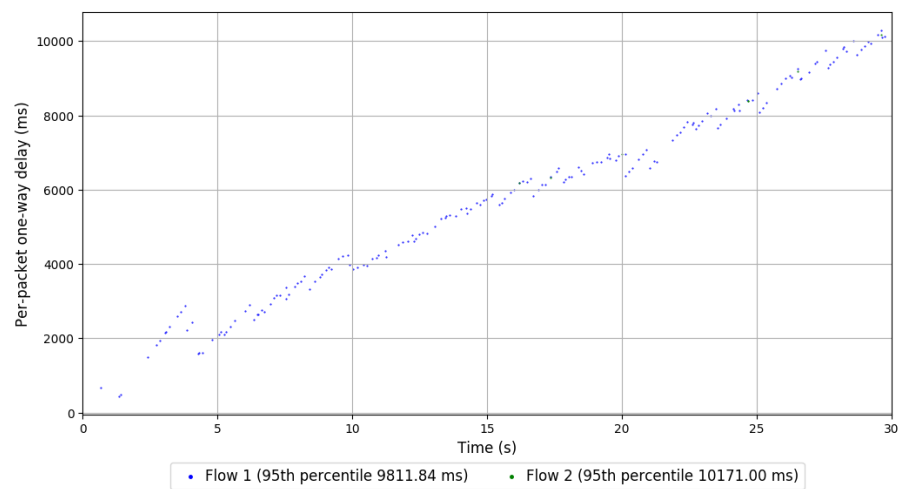
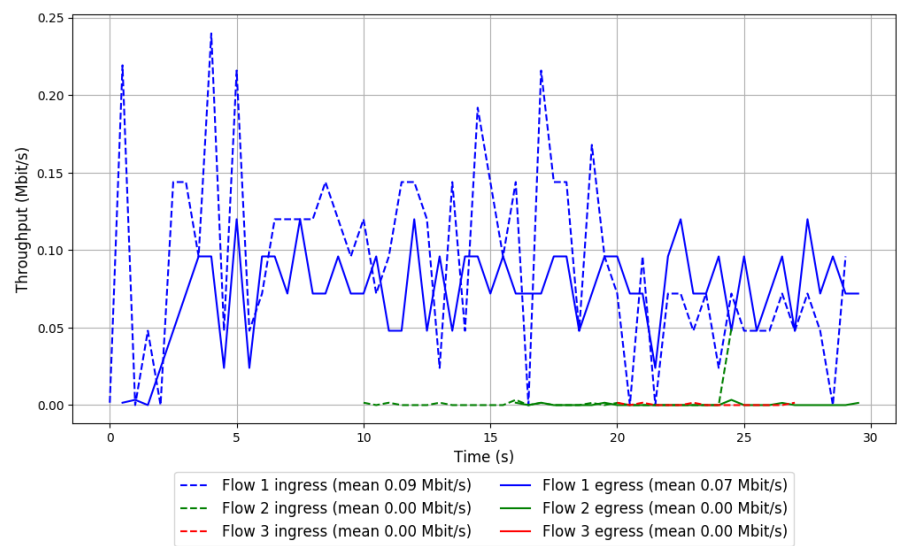


Run 1: Statistics of TCP Cubic

Start at: 2017-09-22 14:31:44  
End at: 2017-09-22 14:32:14  
Local clock offset: 0.057 ms  
Remote clock offset: -0.053 ms

# Below is generated by plot.py at 2017-09-22 15:29:57  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 9851.971 ms  
Loss rate: 21.12%  
-- Flow 1:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 9811.844 ms  
Loss rate: 20.34%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 10171.001 ms  
Loss rate: 82.45%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2017-09-22 14:51:29

End at: 2017-09-22 14:51:59

Local clock offset: 0.079 ms

Remote clock offset: 0.468 ms

# Below is generated by plot.py at 2017-09-22 15:29:57

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 10084.842 ms

Loss rate: 36.11%

-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 10108.835 ms

Loss rate: 35.64%

-- Flow 2:

Average throughput: 0.00 Mbit/s

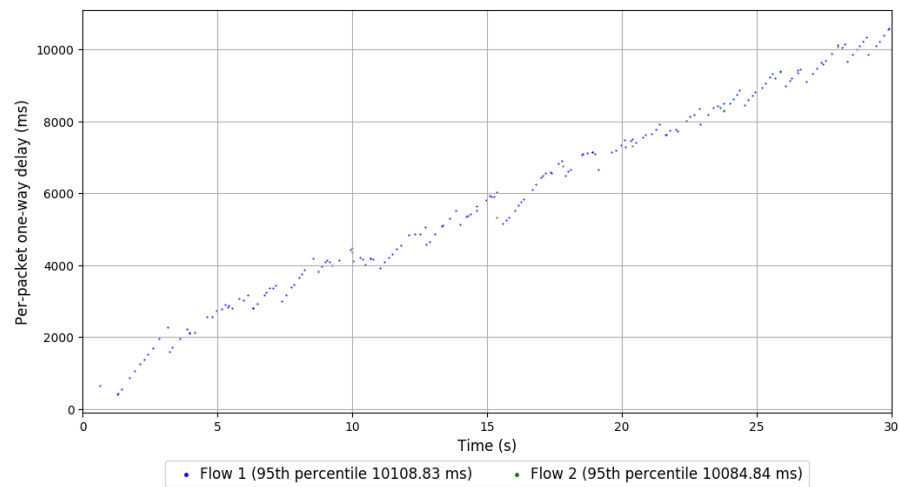
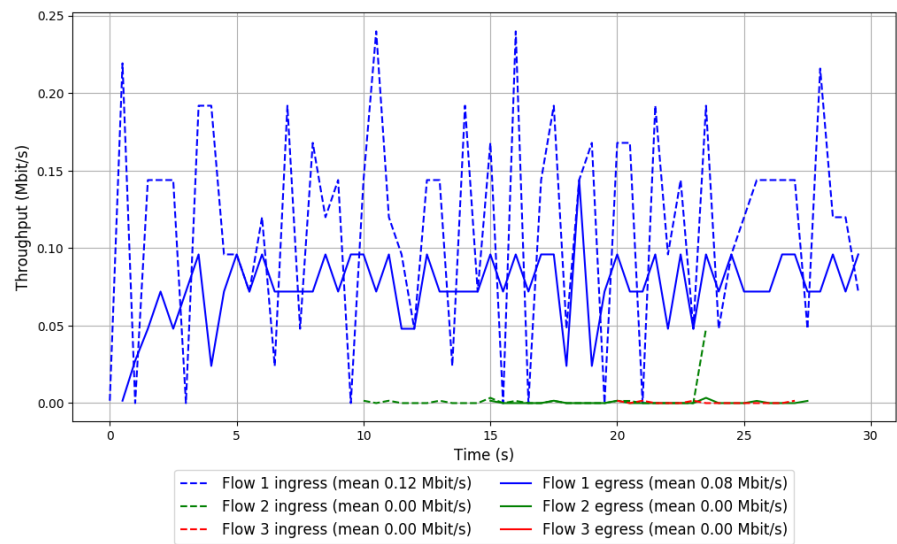
95th percentile per-packet one-way delay: 10084.842 ms

Loss rate: 82.45%

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 2: Report of TCP Cubic — Data Link

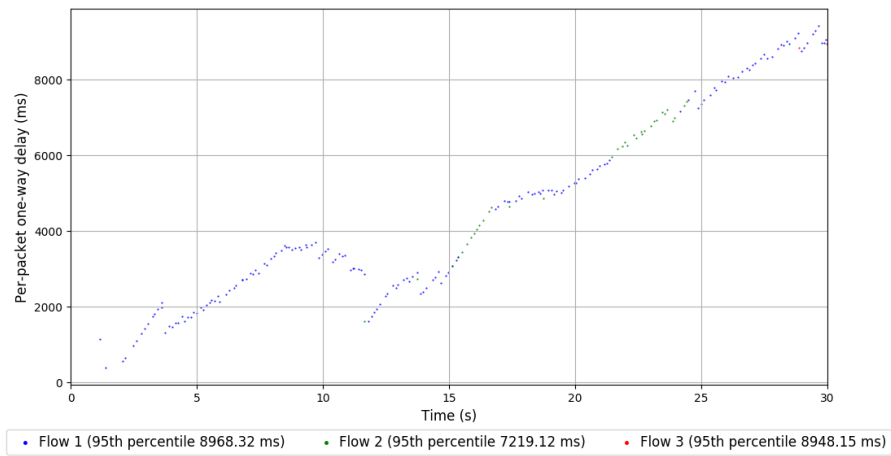
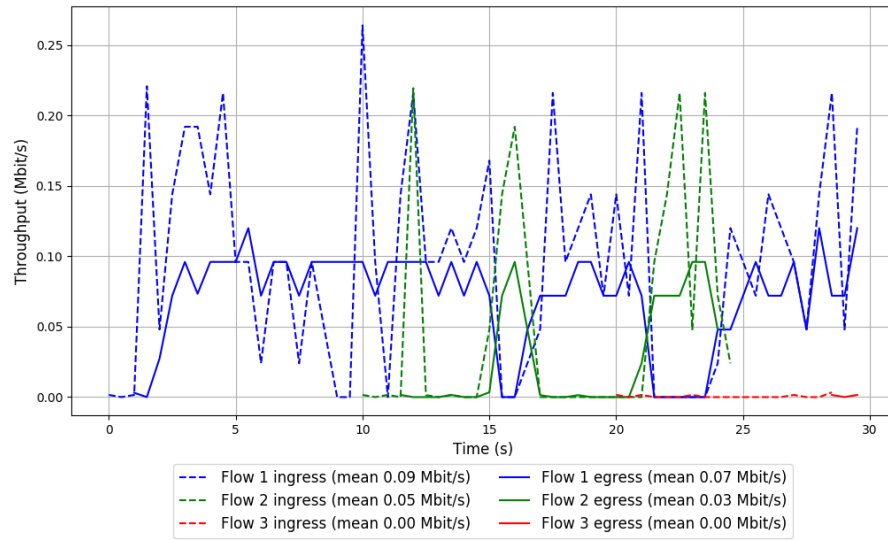


Run 3: Statistics of TCP Cubic

Start at: 2017-09-22 15:11:39  
End at: 2017-09-22 15:12:09  
Local clock offset: 0.117 ms  
Remote clock offset: -2.004 ms

```
# Below is generated by plot.py at 2017-09-22 15:29:57
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 8948.149 ms
Loss rate: 33.30%
-- Flow 1:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 8968.317 ms
Loss rate: 27.74%
-- Flow 2:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 7219.120 ms
Loss rate: 53.64%
-- Flow 3:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8948.149 ms
Loss rate: 67.79%
```

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



Run 1: Statistics of LEDBAT

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/1



Run 1: Report of LEDBAT — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of LEDBAT

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/1

Run 2: Report of LEDBAT — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of LEDBAT

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/1

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

Figure is missing

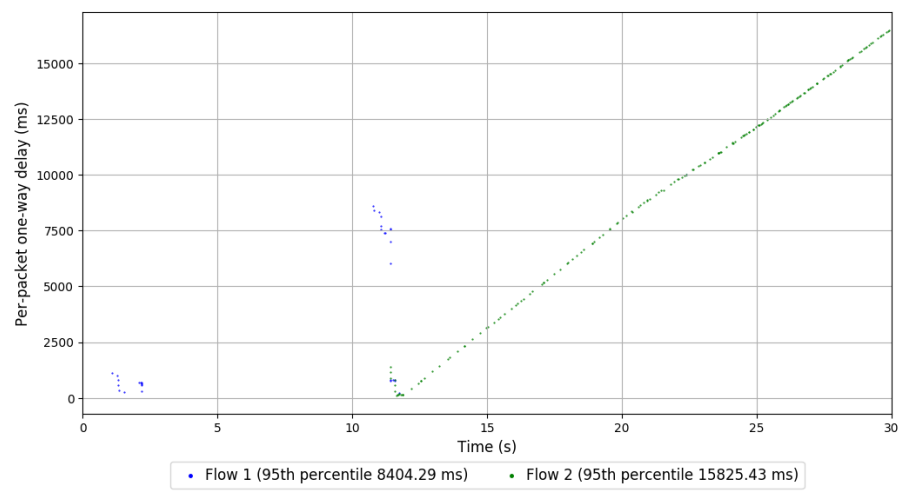
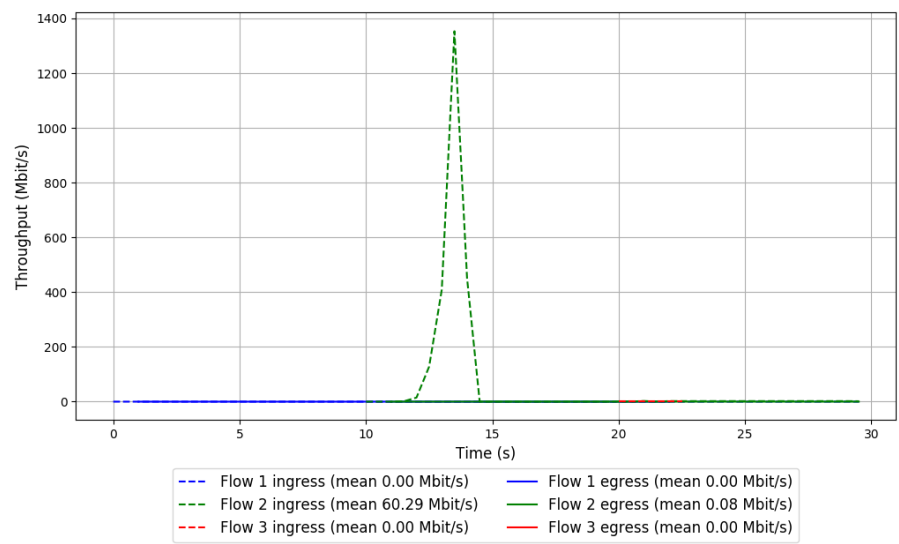
Figure is missing

```
Run 1: Statistics of PCC

Start at: 2017-09-22 14:33:09
End at: 2017-09-22 14:33:39
Local clock offset: 0.164 ms
Remote clock offset: 0.279 ms

# Below is generated by plot.py at 2017-09-22 15:30:18
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 15700.144 ms
Loss rate: 99.88%
-- Flow 1:
Average throughput: 0.00 Mbit/s
95th percentile per-packet one-way delay: 8404.286 ms
Loss rate: 34.09%
-- Flow 2:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 15825.432 ms
Loss rate: 99.88%
-- Flow 3:
Average throughput: 0.00 Mbit/s
```

Run 1: Report of PCC — Data Link



Run 2: Statistics of PCC

Start at: 2017-09-22 14:52:48

End at: 2017-09-22 14:53:18

Local clock offset: 0.191 ms

Remote clock offset: 0.155 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 20833.168 ms

Loss rate: 99.83%

-- Flow 1:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 20833.168 ms

Loss rate: 99.83%

-- Flow 2:

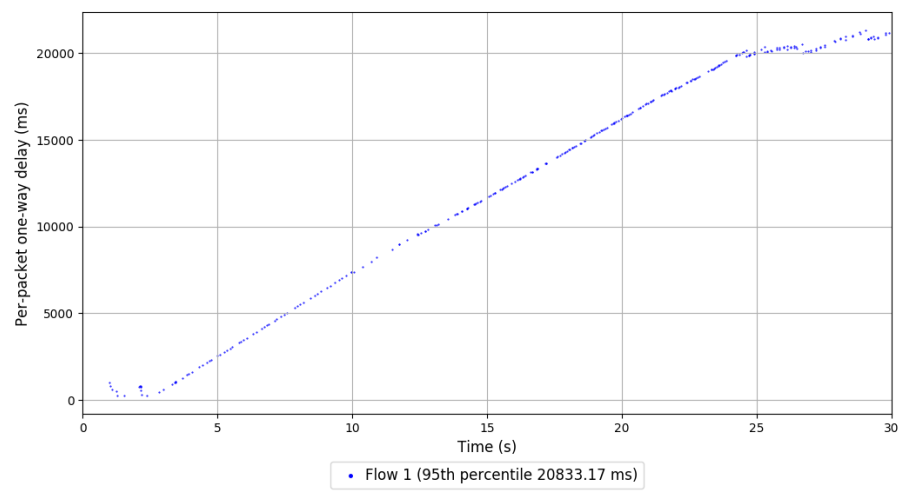
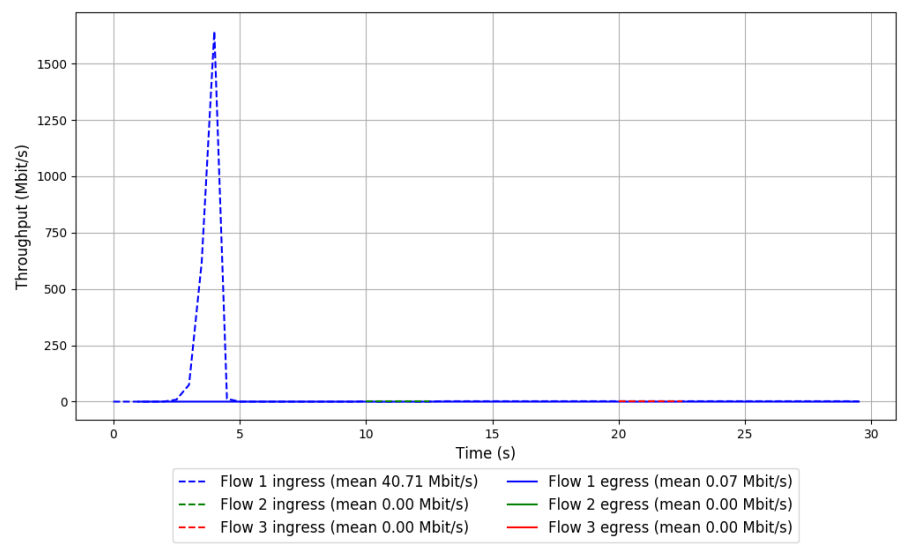
Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s



Run 2: Report of PCC — Data Link

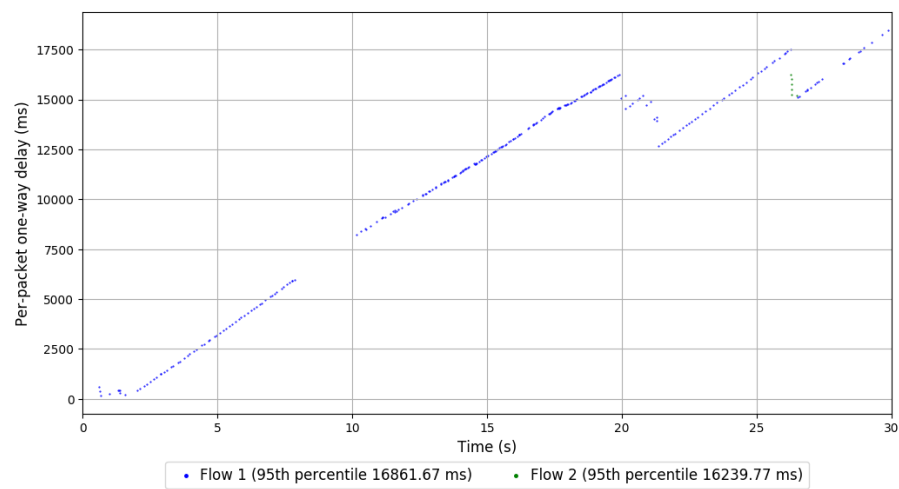
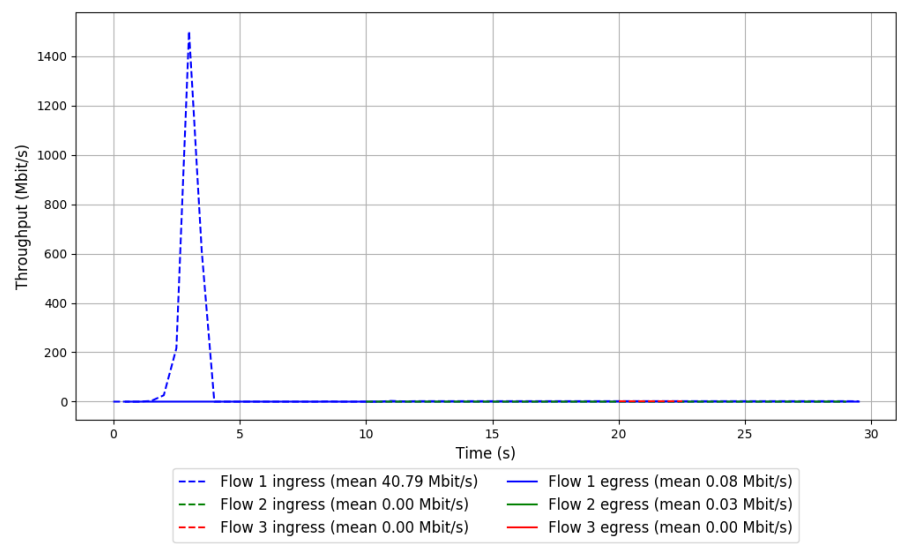


Run 3: Statistics of PCC

Start at: 2017-09-22 15:12:59  
End at: 2017-09-22 15:13:29  
Local clock offset: 0.119 ms  
Remote clock offset: -1.964 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 16861.673 ms  
Loss rate: 99.81%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 16861.673 ms  
Loss rate: 99.81%  
-- Flow 2:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 16239.767 ms  
Loss rate: 68.93%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 3: Report of PCC — Data Link

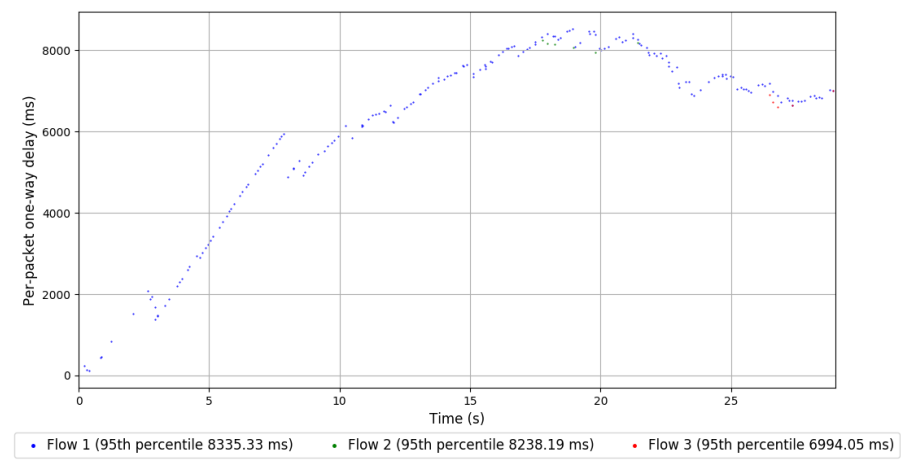
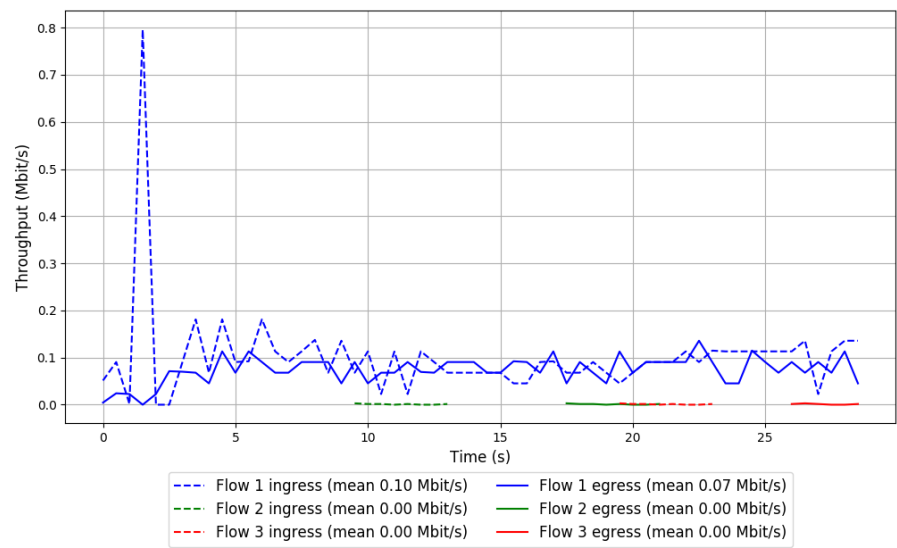


Run 1: Statistics of QUIC Cubic

Start at: 2017-09-22 14:39:09  
End at: 2017-09-22 14:39:39  
Local clock offset: 0.049 ms  
Remote clock offset: -2.028 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 8335.335 ms  
Loss rate: 26.64%  
-- Flow 1:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 8335.335 ms  
Loss rate: 26.69%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 8238.192 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 6994.050 ms  
Loss rate: 16.67%

Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/c

Run 2: Report of QUIC Cubic — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of QUIC Cubic

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/c



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

Figure is missing

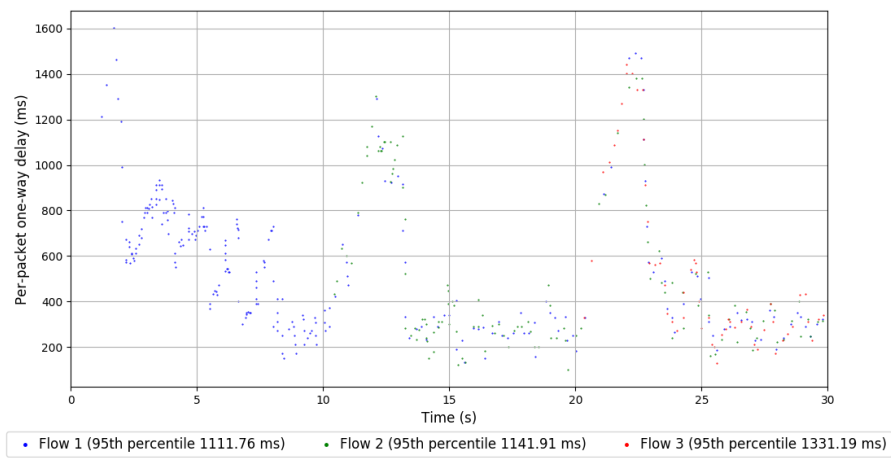
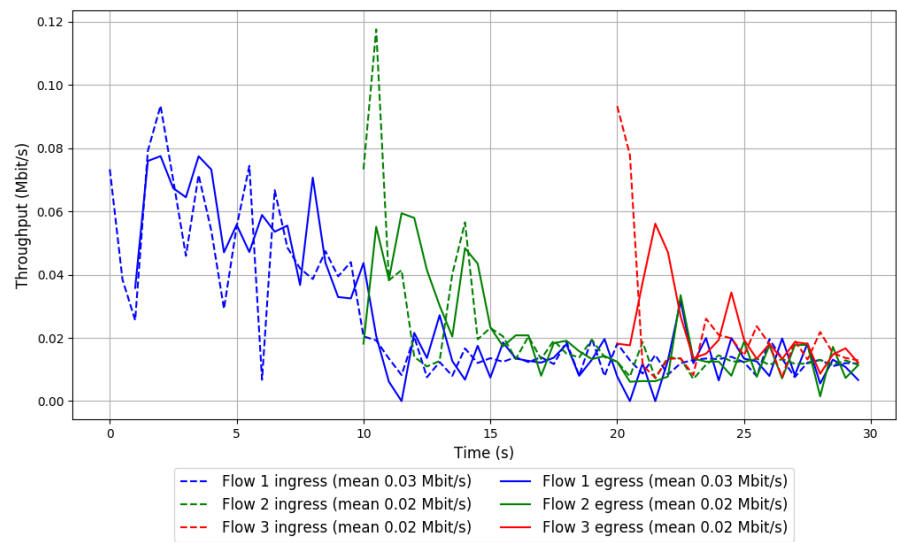
Figure is missing

```
Run 1: Statistics of SCReAM

Start at: 2017-09-22 14:30:19
End at: 2017-09-22 14:30:49
Local clock offset: 0.144 ms
Remote clock offset: 0.252 ms

# Below is generated by plot.py at 2017-09-22 15:30:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.05 Mbit/s
95th percentile per-packet one-way delay: 1191.636 ms
Loss rate: 1.27%
-- Flow 1:
Average throughput: 0.03 Mbit/s
95th percentile per-packet one-way delay: 1111.764 ms
Loss rate: 0.76%
-- Flow 2:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1141.913 ms
Loss rate: 1.37%
-- Flow 3:
Average throughput: 0.02 Mbit/s
95th percentile per-packet one-way delay: 1331.189 ms
Loss rate: 2.86%
```

Run 1: Report of SReAM — Data Link



Run 2: Statistics of SCReAM

Start at: 2017-09-22 14:50:09

End at: 2017-09-22 14:50:39

Local clock offset: 0.161 ms

Remote clock offset: 0.441 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 983.839 ms

Loss rate: 0.72%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 828.953 ms

Loss rate: 0.49%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 881.133 ms

Loss rate: 0.75%

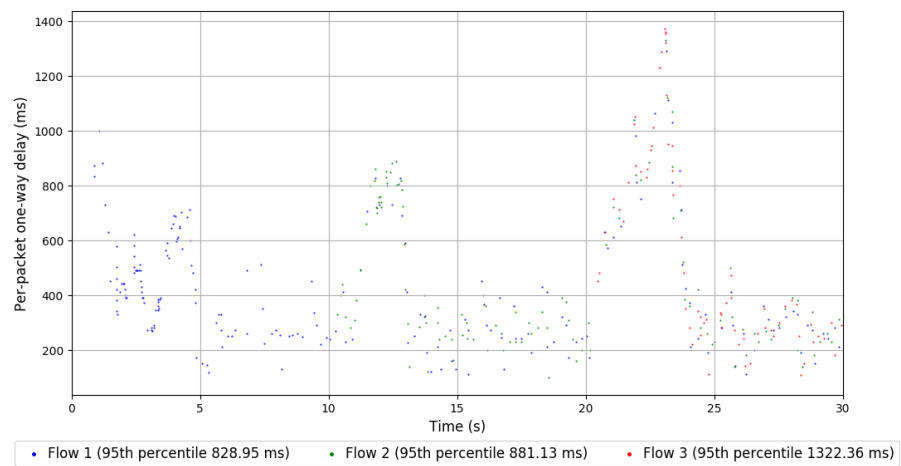
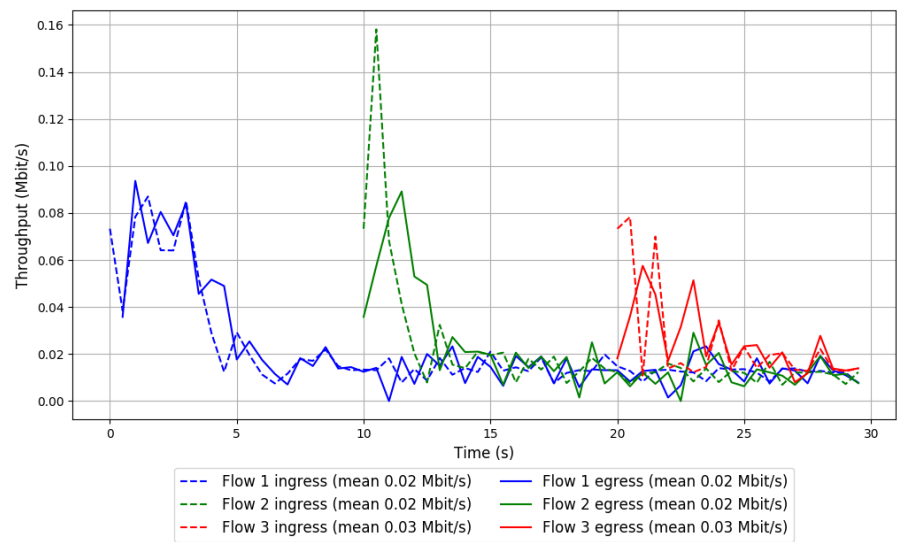
-- Flow 3:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 1322.358 ms

Loss rate: 1.27%

Run 2: Report of SReAM — Data Link

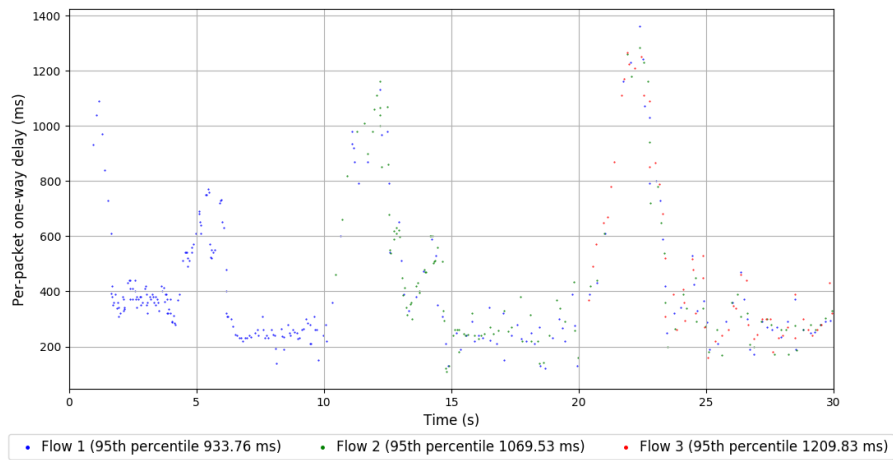
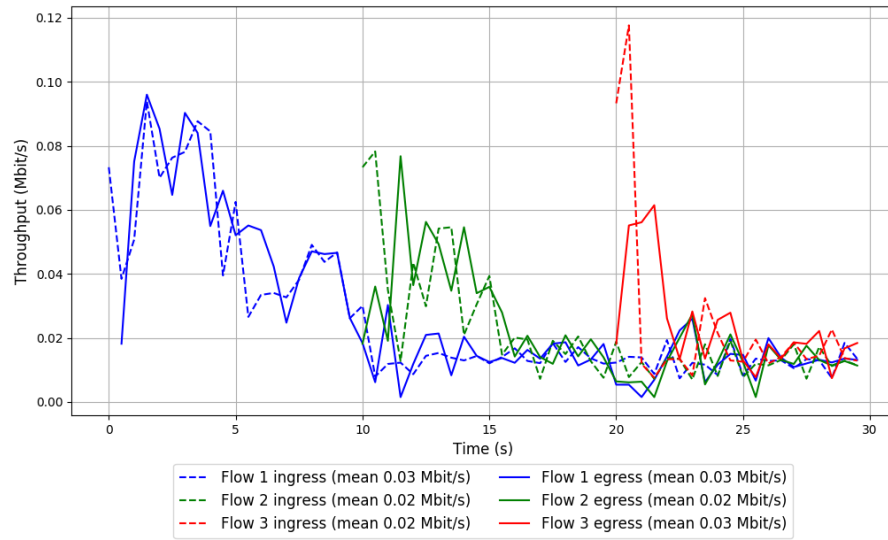


Run 3: Statistics of SCReAM

Start at: 2017-09-22 15:10:13  
End at: 2017-09-22 15:10:43  
Local clock offset: 0.203 ms  
Remote clock offset: -1.965 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 1069.528 ms  
Loss rate: 0.64%  
-- Flow 1:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 933.758 ms  
Loss rate: 0.41%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 1069.528 ms  
Loss rate: 0.66%  
-- Flow 3:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 1209.825 ms  
Loss rate: 1.37%

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



Run 1: Statistics of WebRTC media

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/v



Run 1: Report of WebRTC media — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of WebRTC media

Start at: 2017-09-22 14:54:27

End at: 2017-09-22 14:54:57

Local clock offset: 0.185 ms

Remote clock offset: 0.136 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 9436.803 ms

Loss rate: 7.00%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 9243.952 ms

Loss rate: 0.59%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 9522.651 ms

Loss rate: 54.41%

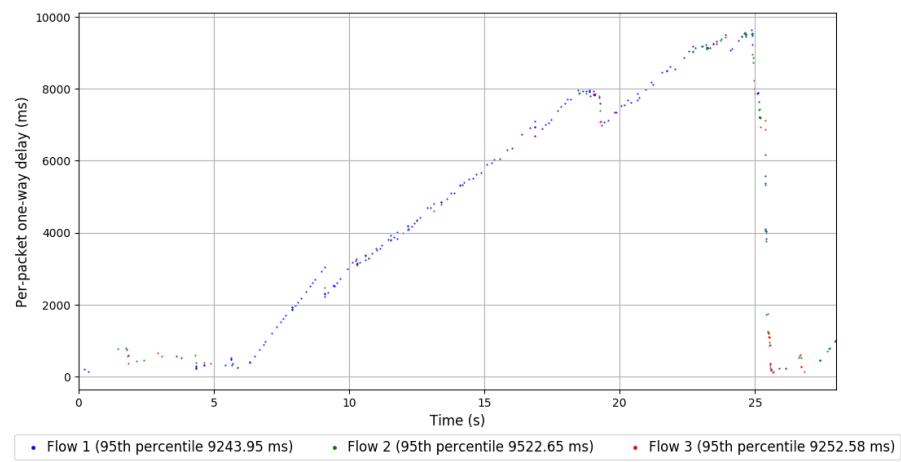
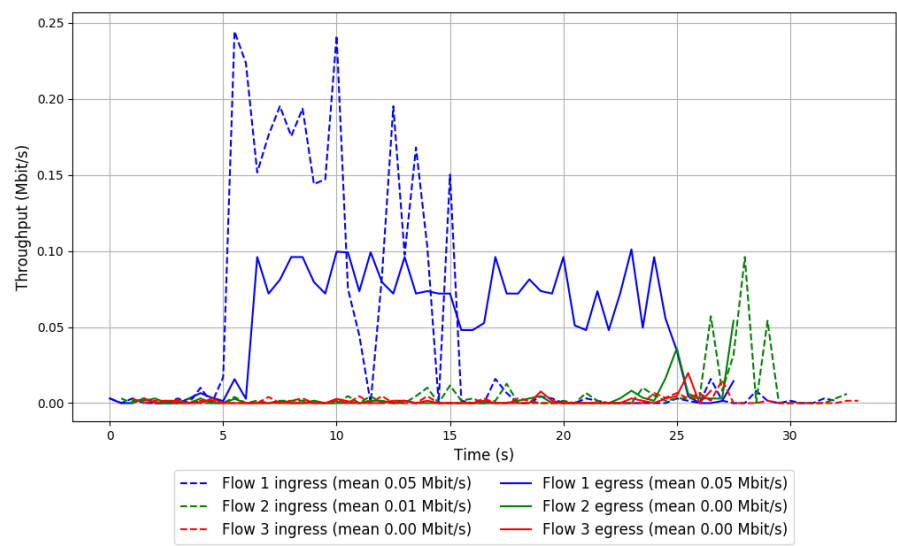
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 9252.585 ms

Loss rate: 22.32%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

/home/ubuntu/pantheon\_data/2017-09-22T14-29-AWS-California-2-to-Mexico-ppp0-3-runs-3-flows/v

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

Figure is missing

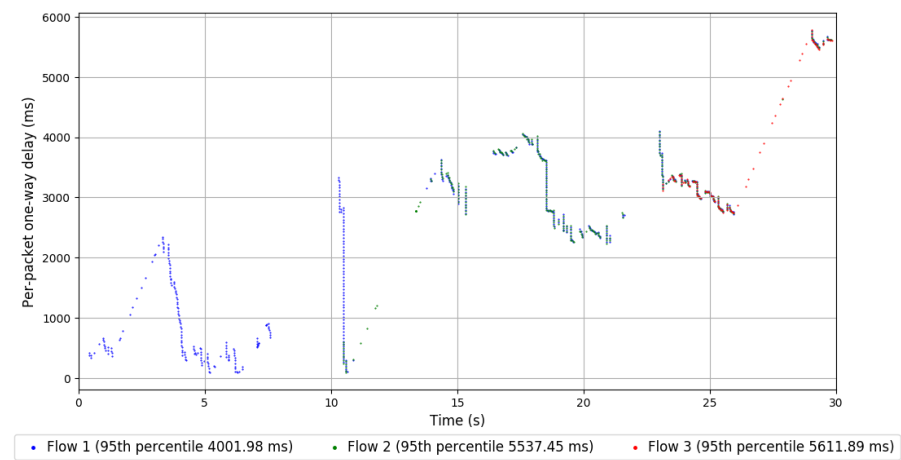
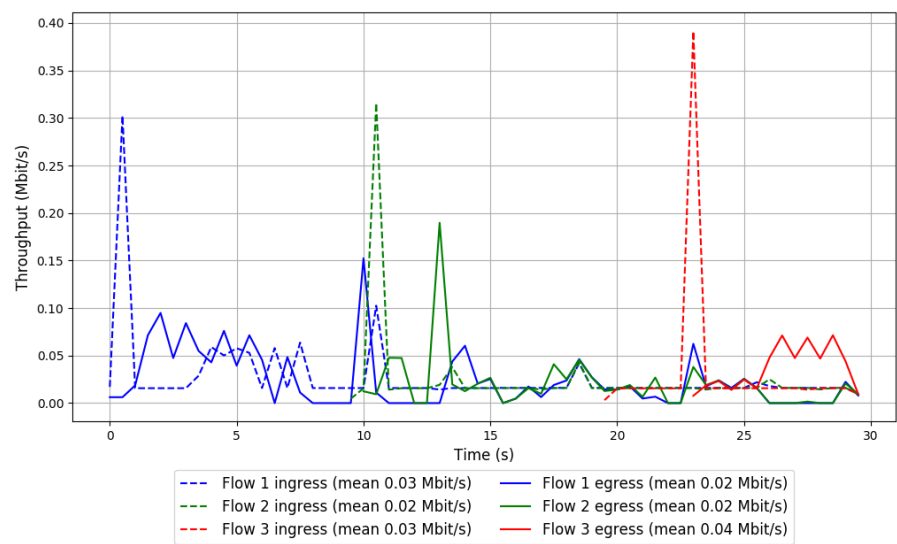
Figure is missing

Run 1: Statistics of Sprout

Start at: 2017-09-22 14:48:49  
End at: 2017-09-22 14:49:19  
Local clock offset: 0.065 ms  
Remote clock offset: -1.962 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 5541.619 ms  
Loss rate: 16.58%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 4001.982 ms  
Loss rate: 11.59%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 5537.454 ms  
Loss rate: 18.73%  
-- Flow 3:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 5611.886 ms  
Loss rate: 25.25%

Run 1: Report of Sprout — Data Link



Run 2: Statistics of Sprout

Start at: 2017-09-22 15:08:54

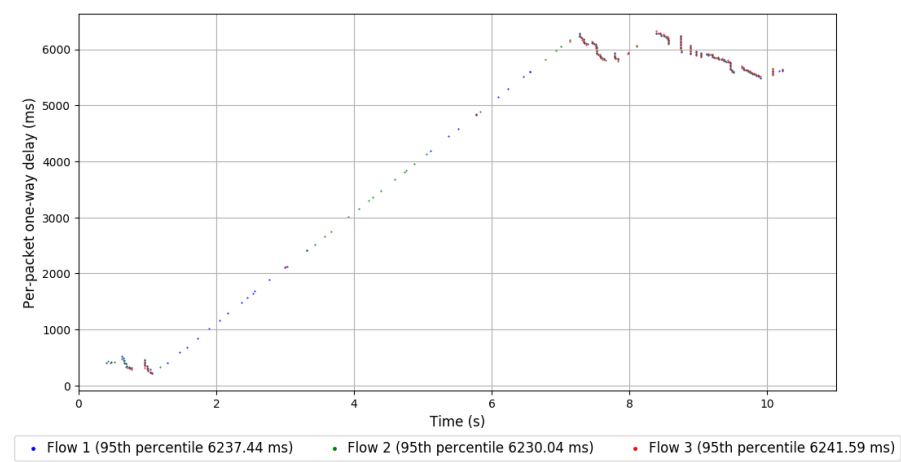
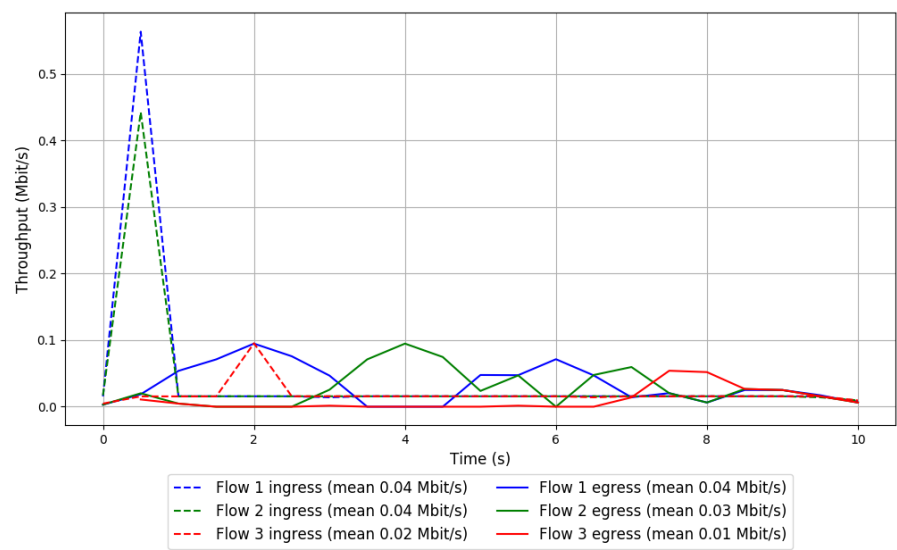
End at: 2017-09-22 15:09:24

Local clock offset: 0.111 ms

Remote clock offset: -0.031 ms



Run 2: Report of Sprout — Data Link



Run 3: Statistics of Sprout

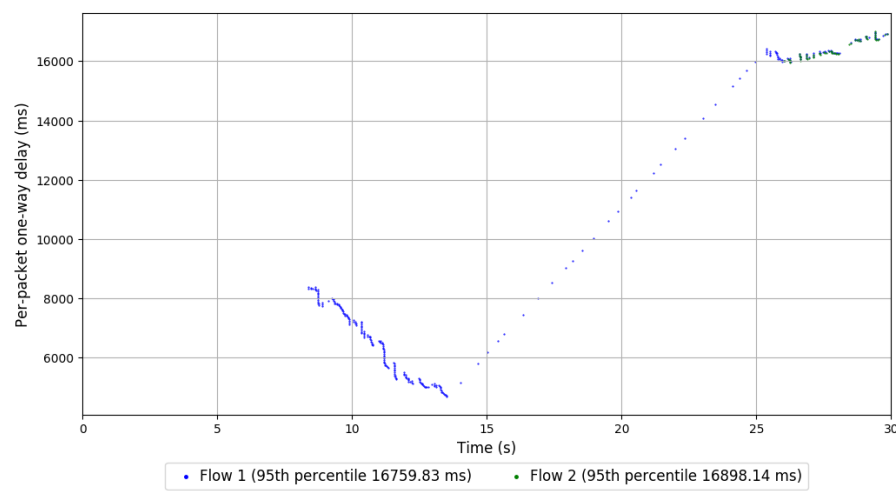
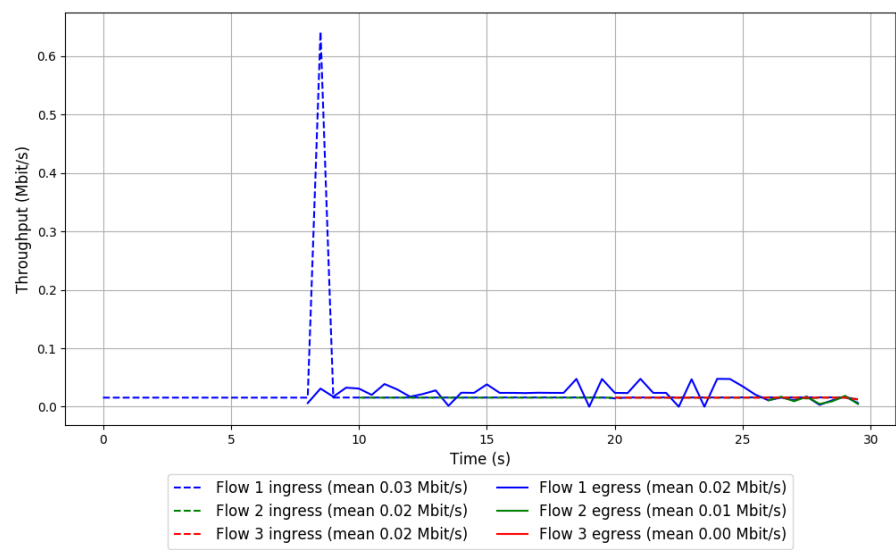
Start at: 2017-09-22 15:28:49

End at: 2017-09-22 15:29:19

Local clock offset: 0.156 ms

Remote clock offset: -2.011 ms

Run 3: Report of Sprout — Data Link

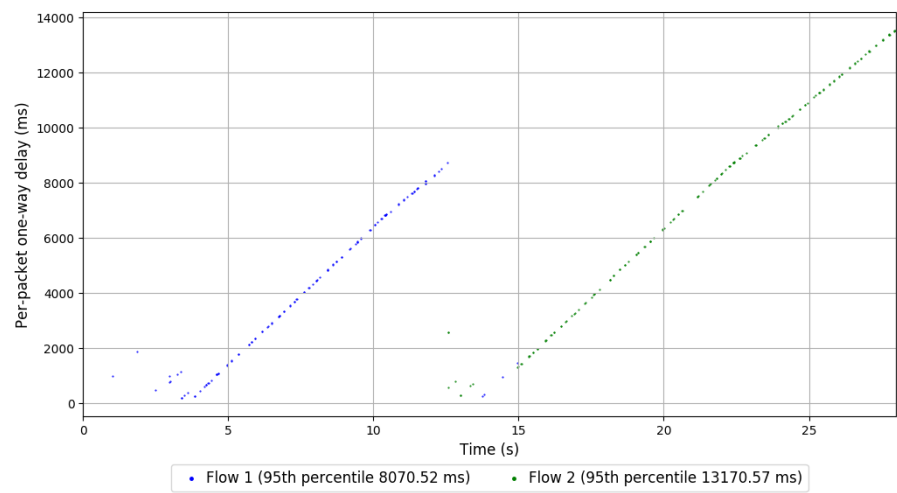
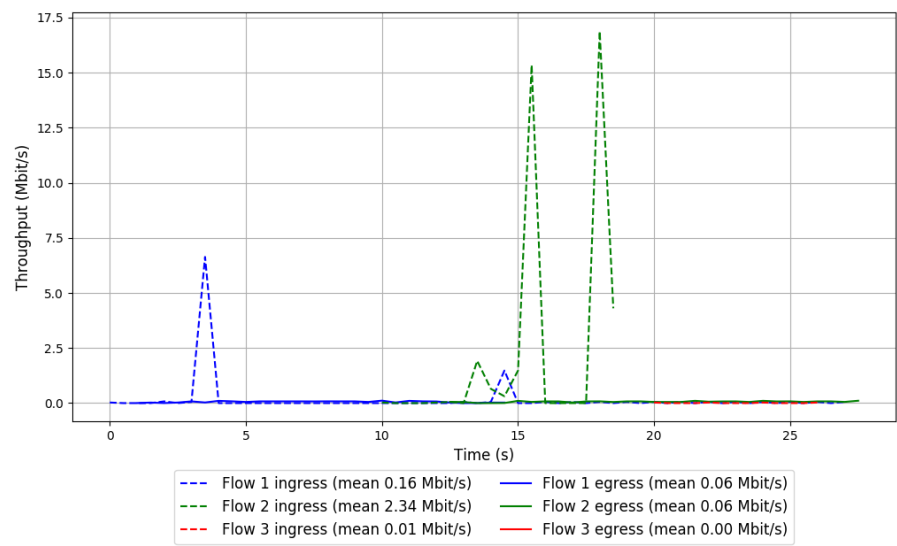


Run 1: Statistics of TaoVA-100x

Start at: 2017-09-22 14:41:48  
End at: 2017-09-22 14:42:18  
Local clock offset: 0.158 ms  
Remote clock offset: -2.107 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 12760.090 ms  
Loss rate: 93.01%  
-- Flow 1:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 8070.521 ms  
Loss rate: 82.91%  
-- Flow 2:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 13170.569 ms  
Loss rate: 95.21%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

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



Run 2: Statistics of TaoVA-100x

Start at: 2017-09-22 15:01:46

End at: 2017-09-22 15:02:16

Local clock offset: 0.1 ms

Remote clock offset: 0.019 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 9022.162 ms

Loss rate: 80.10%

-- Flow 1:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 9140.281 ms

Loss rate: 28.33%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 7715.891 ms

Loss rate: 97.50%

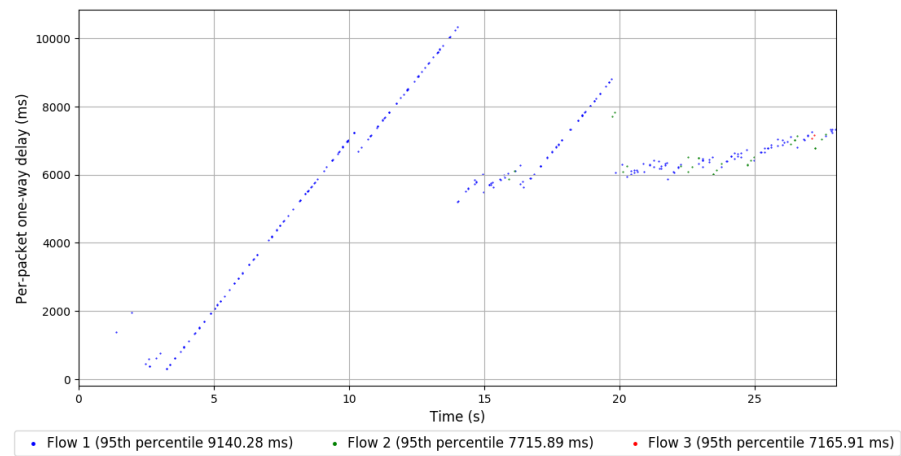
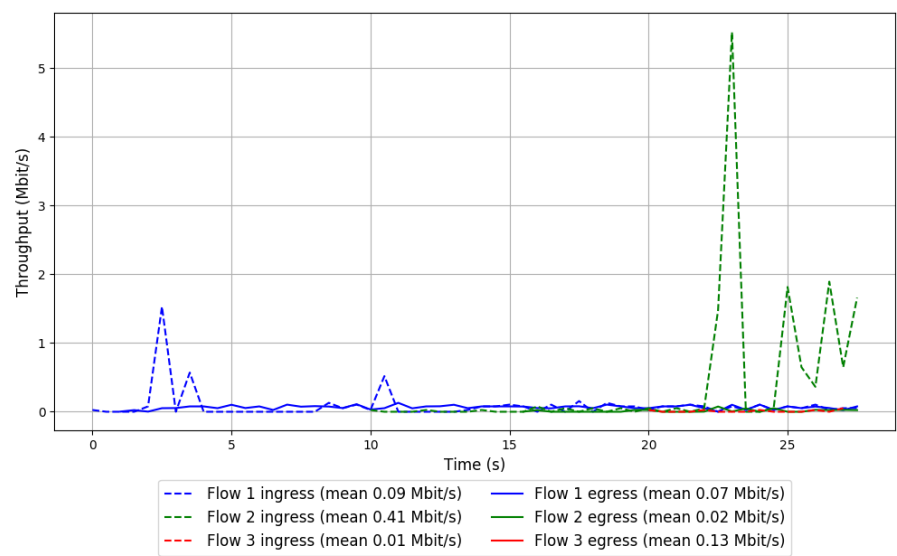
-- Flow 3:

Average throughput: 0.13 Mbit/s

95th percentile per-packet one-way delay: 7165.910 ms

Loss rate: 83.33%

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



Run 3: Statistics of TaoVA-100x

Start at: 2017-09-22 15:21:42

End at: 2017-09-22 15:22:12

Local clock offset: 0.147 ms

Remote clock offset: 0.149 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 11504.196 ms

Loss rate: 96.92%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 11504.196 ms

Loss rate: 95.77%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 6476.129 ms

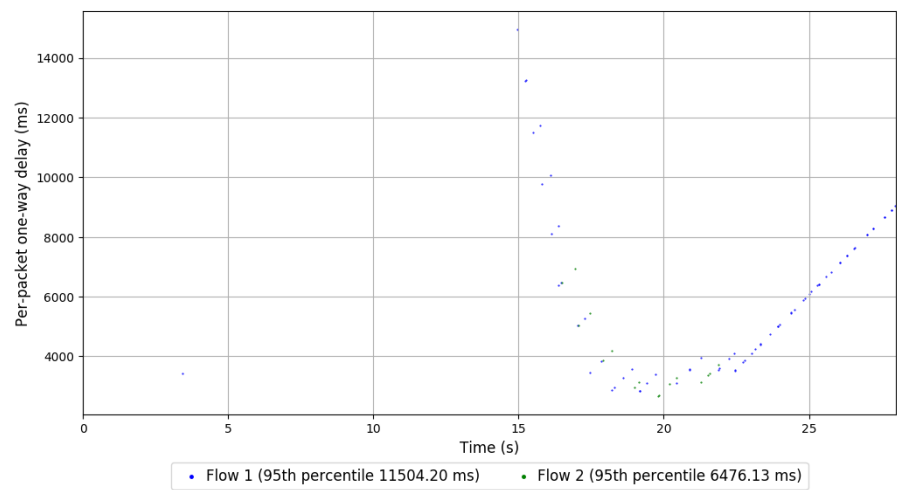
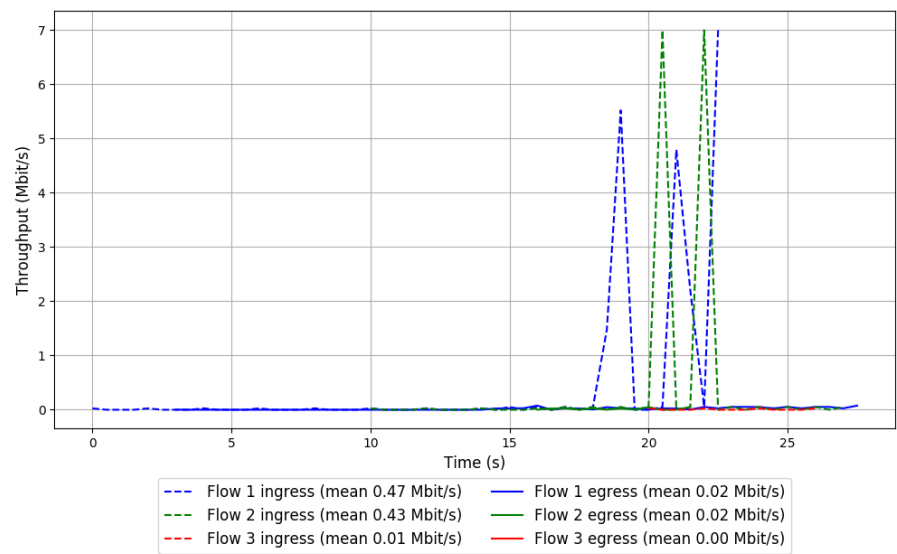
Loss rate: 98.58%

-- Flow 3:

Average throughput: 0.00 Mbit/s



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



Run 1: Statistics of TCP Vegas

Start at: 2017-09-22 14:46:09

End at: 2017-09-22 14:46:39

Local clock offset: 0.058 ms

Remote clock offset: 0.555 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 6977.543 ms

Loss rate: 12.35%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 6977.543 ms

Loss rate: 8.71%

-- Flow 2:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 6887.254 ms

Loss rate: 16.96%

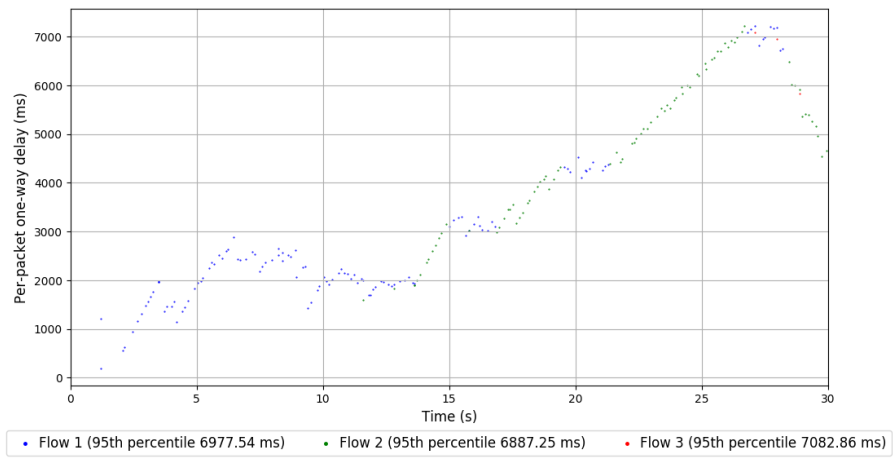
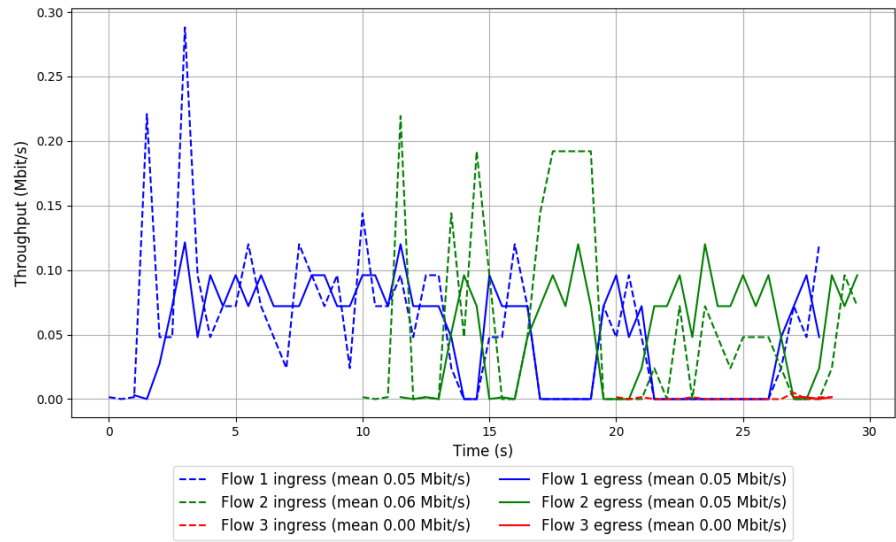
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 7082.861 ms

Loss rate: 62.69%

# Run 1: Report of TCP Vegas — Data Link

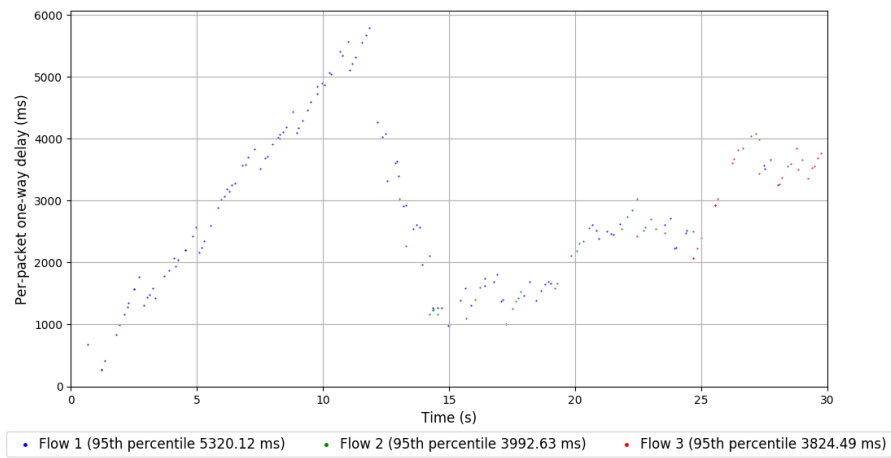
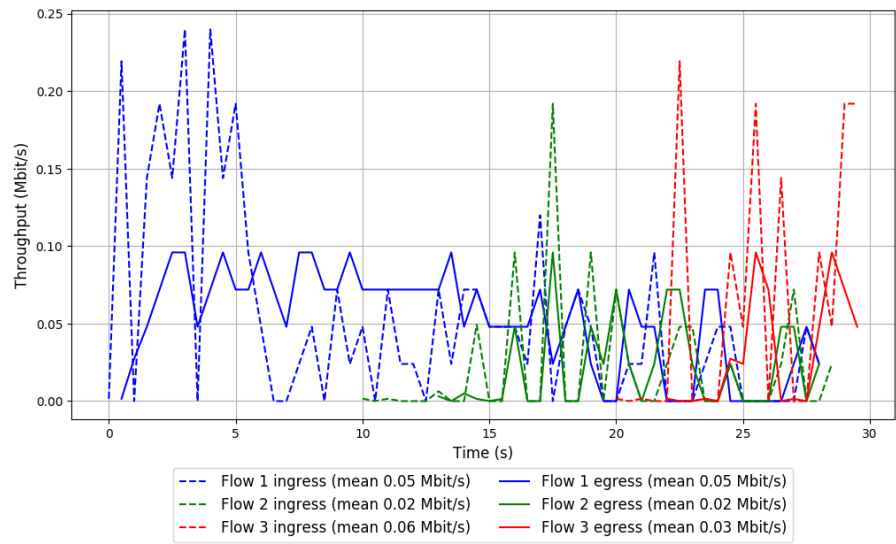


Run 2: Statistics of TCP Vegas

Start at: 2017-09-22 15:06:06  
End at: 2017-09-22 15:06:36  
Local clock offset: 0.194 ms  
Remote clock offset: -1.979 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 5065.295 ms  
Loss rate: 19.91%  
-- Flow 1:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 5320.123 ms  
Loss rate: 3.96%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 3992.629 ms  
Loss rate: 17.94%  
-- Flow 3:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 3824.485 ms  
Loss rate: 60.40%

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



Run 3: Statistics of TCP Vegas

Start at: 2017-09-22 15:26:10

End at: 2017-09-22 15:26:40

Local clock offset: 0.258 ms

Remote clock offset: 0.127 ms

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

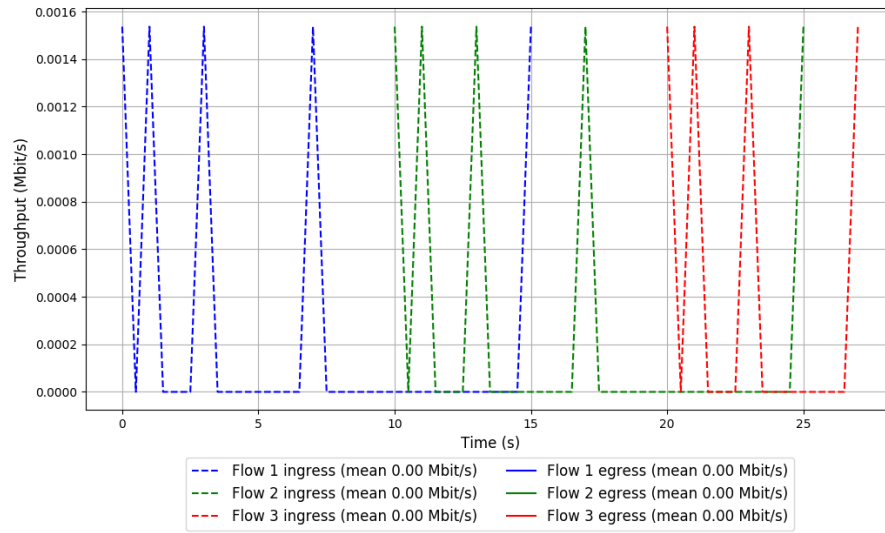


Figure is missing

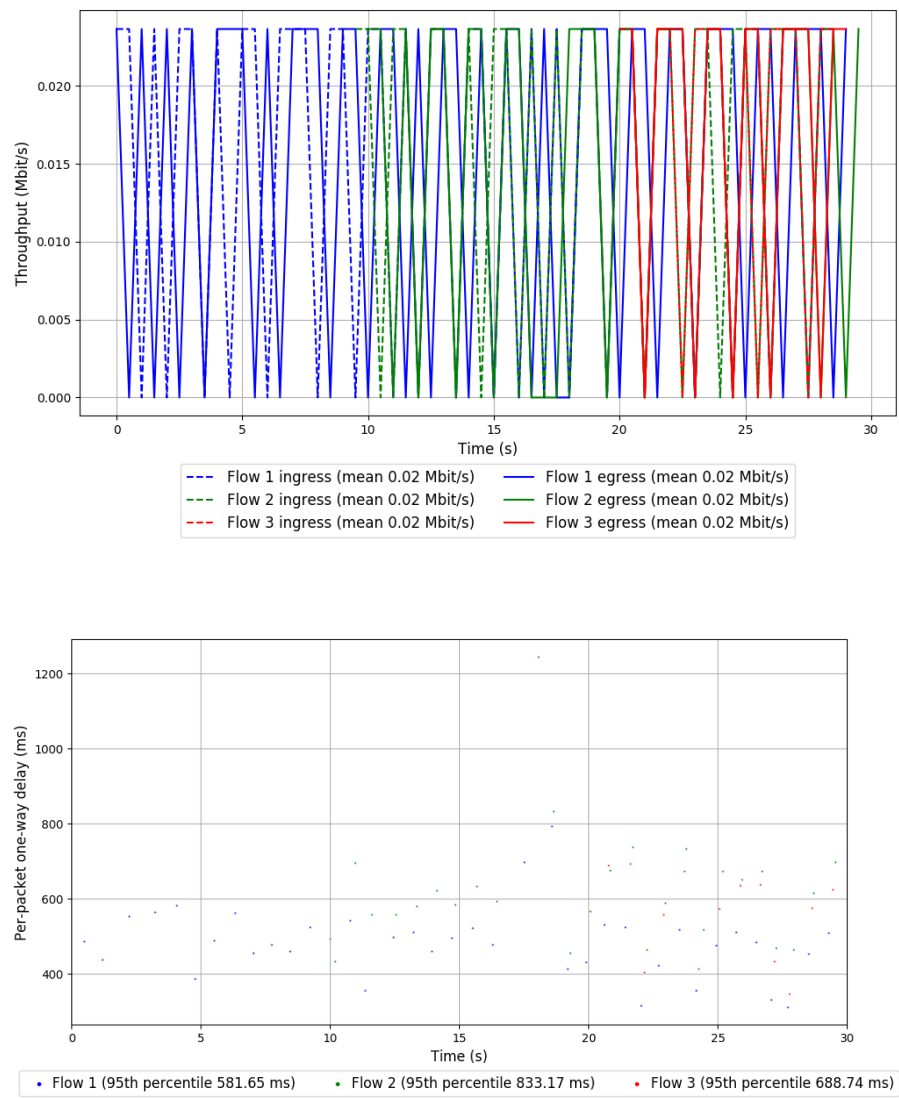
Run 1: Statistics of Verus

Start at: 2017-09-22 14:47:29  
End at: 2017-09-22 14:47:59  
Local clock offset: 0.071 ms  
Remote clock offset: -0.042 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 733.070 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 581.647 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 833.166 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 688.738 ms  
Loss rate: 0.00%



Run 1: Report of Verus — Data Link

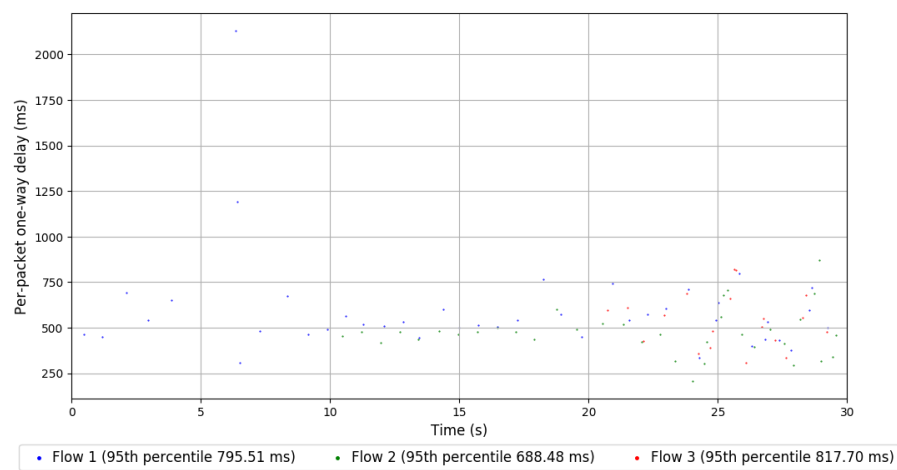
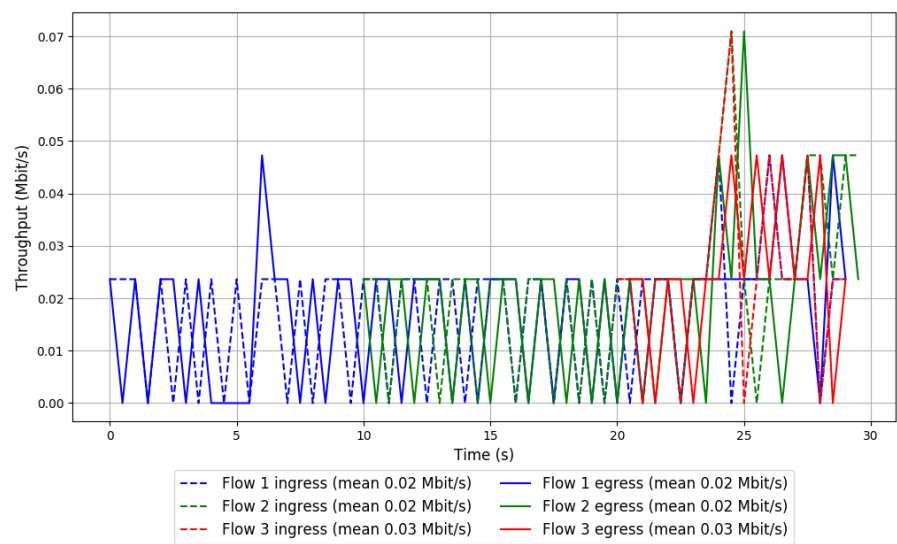


Run 2: Statistics of Verus

Start at: 2017-09-22 15:07:34  
End at: 2017-09-22 15:08:04  
Local clock offset: 0.195 ms  
Remote clock offset: -0.017 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 795.511 ms  
Loss rate: 4.00%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 795.511 ms  
Loss rate: 2.33%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 688.475 ms  
Loss rate: 5.41%  
-- Flow 3:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 817.699 ms  
Loss rate: 5.00%

Run 2: Report of Verus — Data Link



Run 3: Statistics of Verus

Start at: 2017-09-22 15:27:29

End at: 2017-09-22 15:27:59

Local clock offset: 0.243 ms

Remote clock offset: 0.608 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1856.005 ms

Loss rate: 6.45%

-- Flow 1:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1879.519 ms

Loss rate: 3.23%

-- Flow 2:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 1486.051 ms

Loss rate: 10.00%

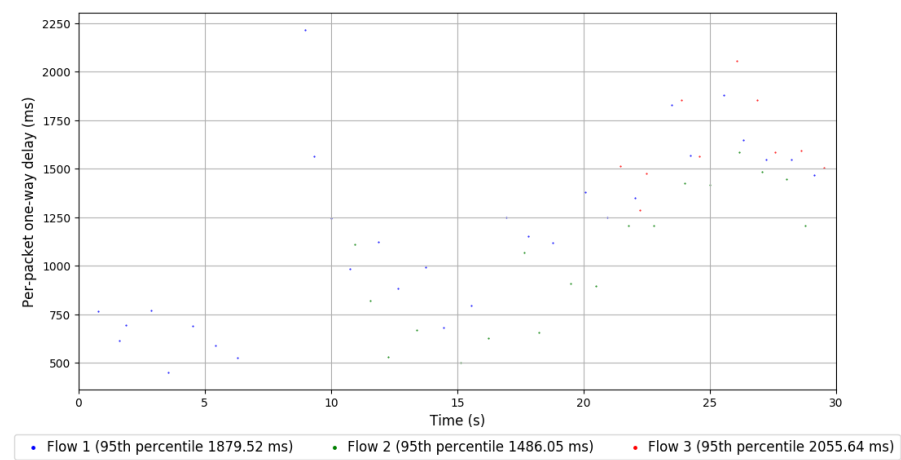
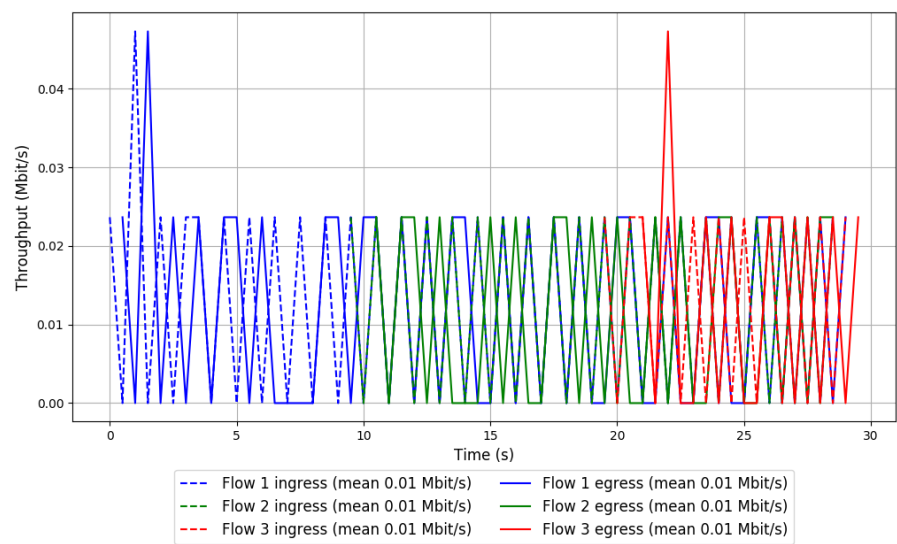
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 2055.645 ms

Loss rate: 9.09%

Run 3: Report of Verus — Data Link

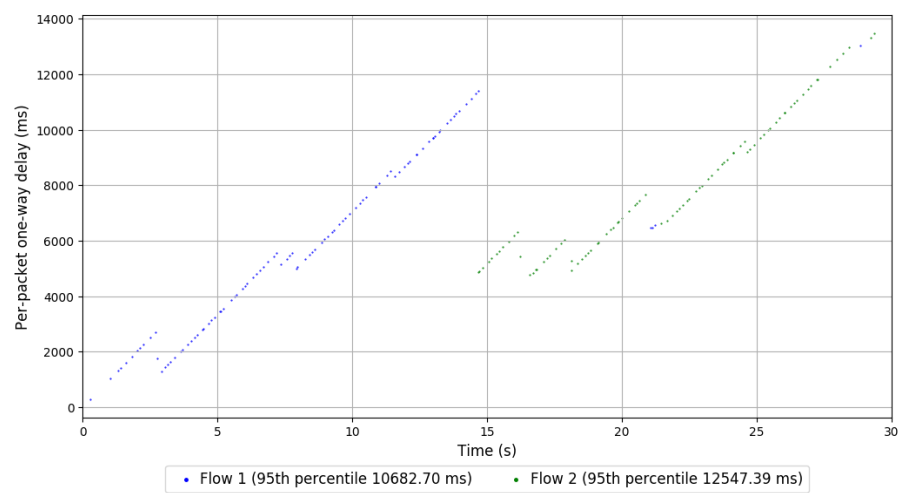
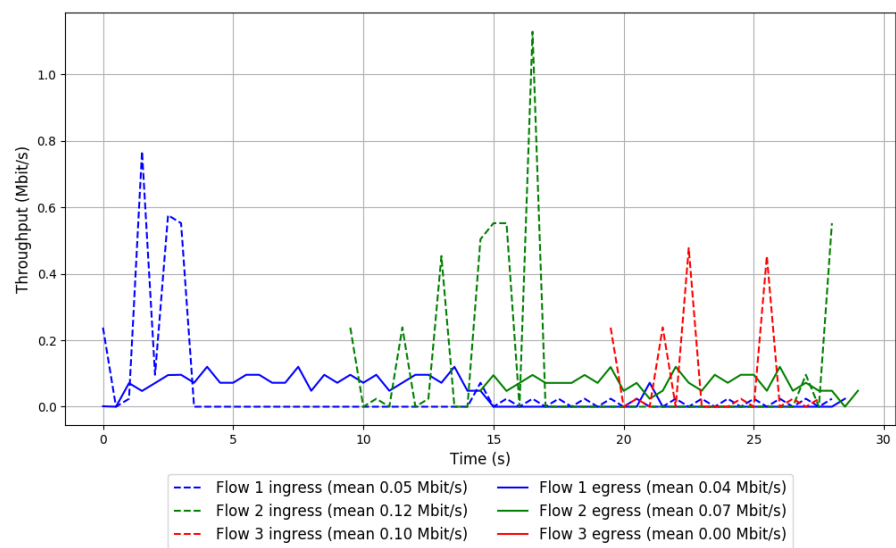


Run 1: Statistics of Indigo

Start at: 2017-09-22 14:36:11  
End at: 2017-09-22 14:36:41  
Local clock offset: 0.162 ms  
Remote clock offset: -2.138 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 11587.583 ms  
Loss rate: 47.88%  
-- Flow 1:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 10682.704 ms  
Loss rate: 10.92%  
-- Flow 2:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 12547.391 ms  
Loss rate: 52.28%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 1: Report of Indigo — Data Link



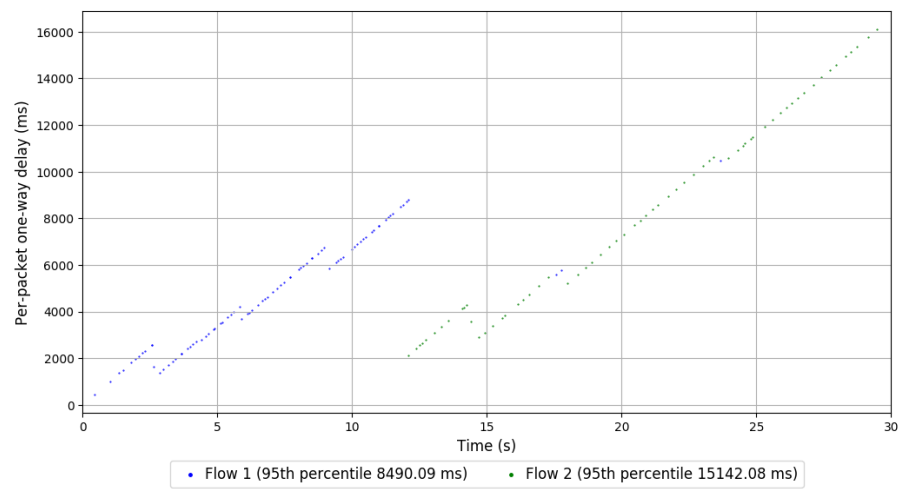
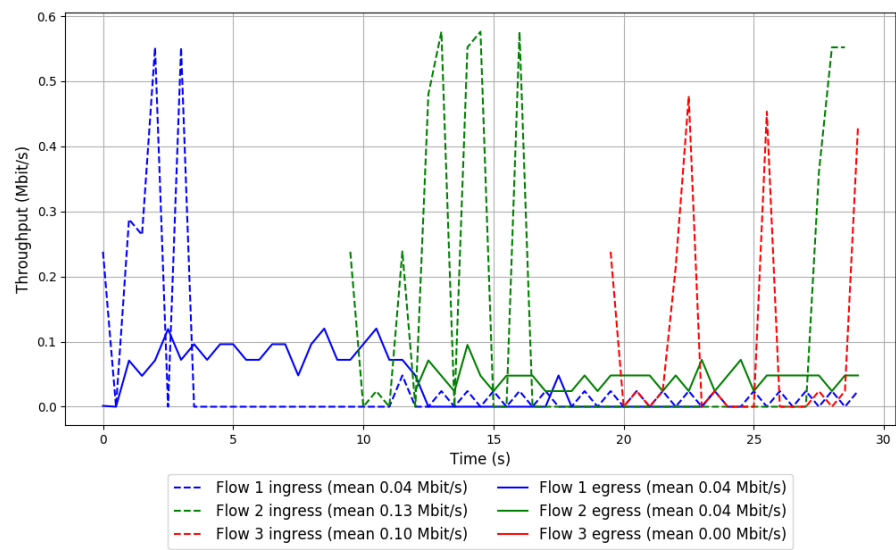
Run 2: Statistics of Indigo

Start at: 2017-09-22 14:55:47  
End at: 2017-09-22 14:56:17  
Local clock offset: 0.116 ms  
Remote clock offset: -1.975 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 14041.928 ms  
Loss rate: 61.32%  
-- Flow 1:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 8490.095 ms  
Loss rate: 15.48%  
-- Flow 2:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 15142.082 ms  
Loss rate: 68.07%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s



Run 2: Report of Indigo — Data Link

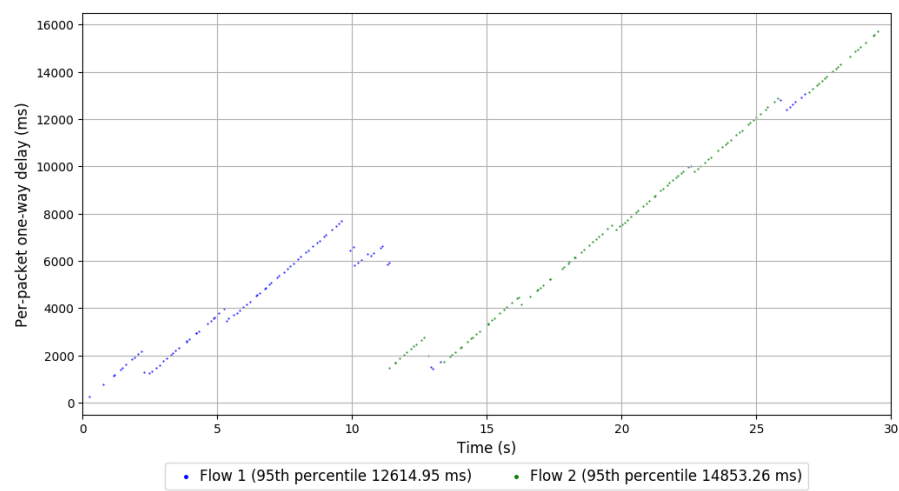
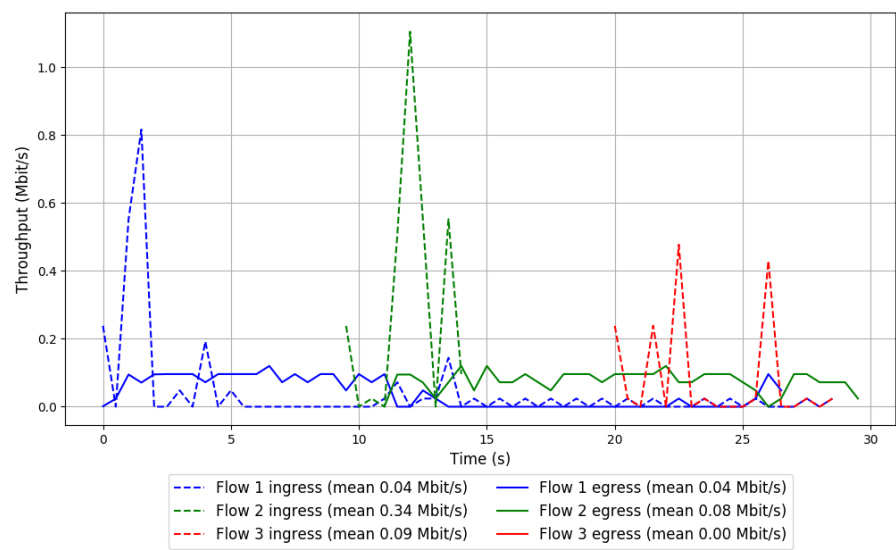


Run 3: Statistics of Indigo

Start at: 2017-09-22 15:16:01  
End at: 2017-09-22 15:16:31  
Local clock offset: 0.203 ms  
Remote clock offset: -1.979 ms

# Below is generated by plot.py at 2017-09-22 15:30:19  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 14033.348 ms  
Loss rate: 28.73%  
-- Flow 1:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 12614.947 ms  
Loss rate: 13.47%  
-- Flow 2:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 14853.261 ms  
Loss rate: 6.25%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Indigo-cellular

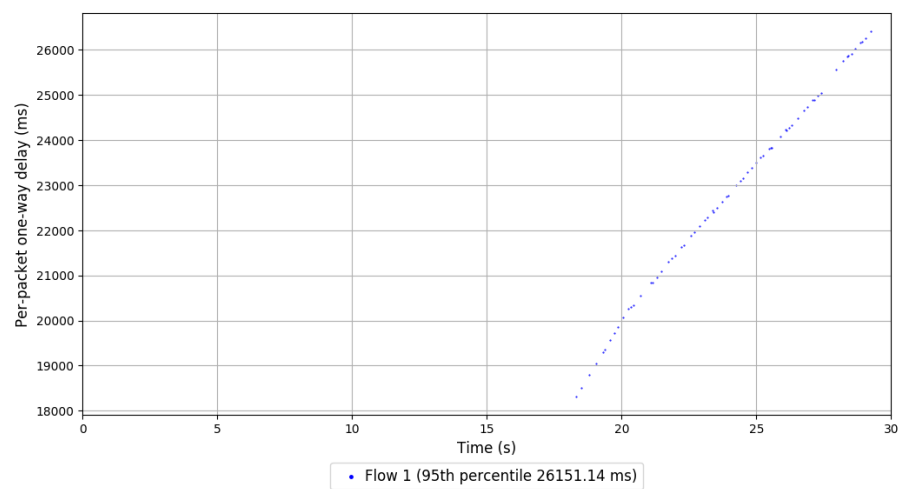
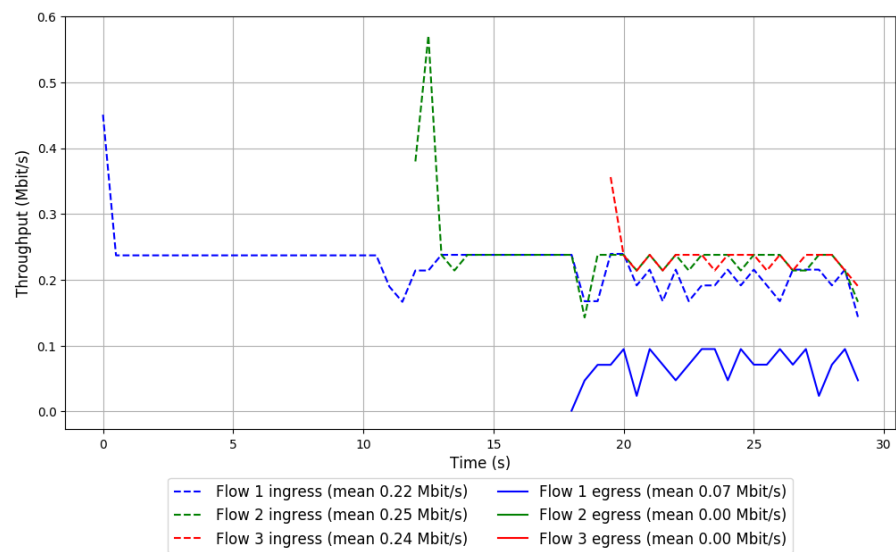
Start at: 2017-09-22 14:37:31

End at: 2017-09-22 14:38:01

Local clock offset: 0.066 ms

Remote clock offset: -2.108 ms

Run 1: Report of Indigo-cellular — Data Link



Run 2: Statistics of Indigo-cellular

Start at: 2017-09-22 14:57:24

End at: 2017-09-22 14:57:54

Local clock offset: 0.214 ms

Remote clock offset: 0.096 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 19266.437 ms

Loss rate: 85.05%

-- Flow 1:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 19266.437 ms

Loss rate: 68.26%

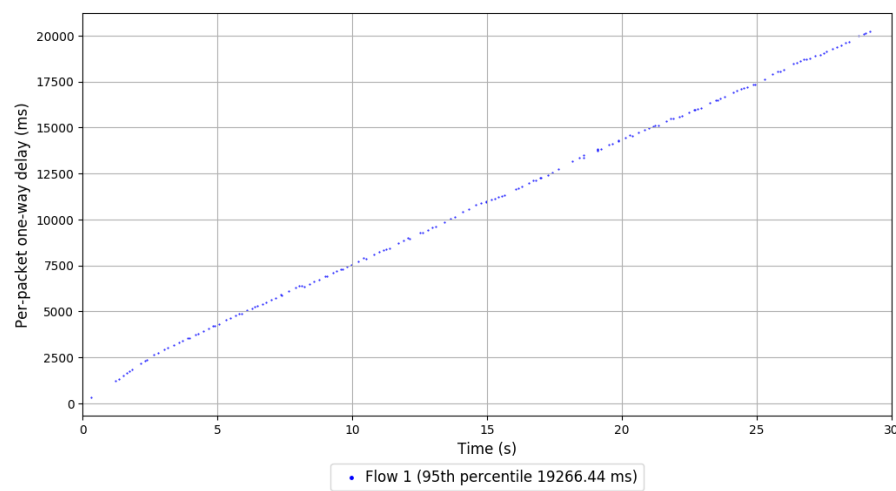
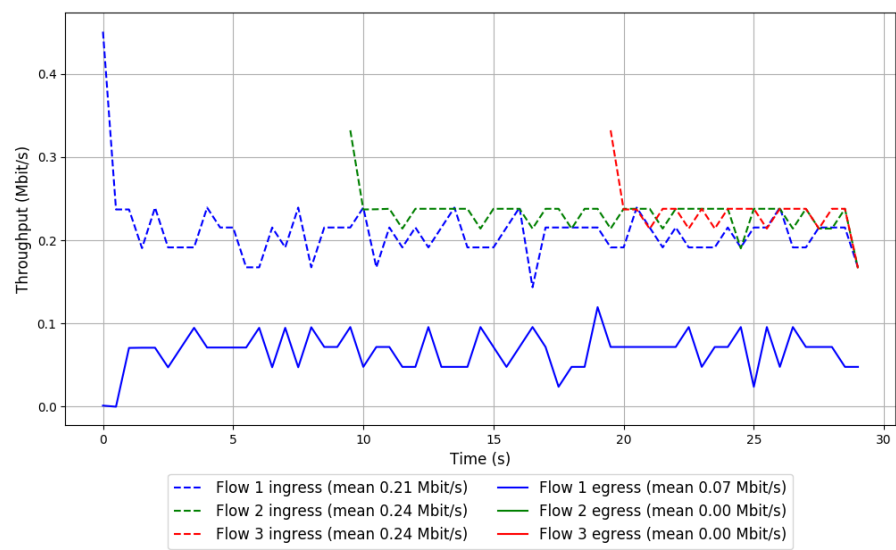
-- Flow 2:

Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 2: Report of Indigo-cellular — Data Link



Run 3: Statistics of Indigo-cellular

Start at: 2017-09-22 15:17:21

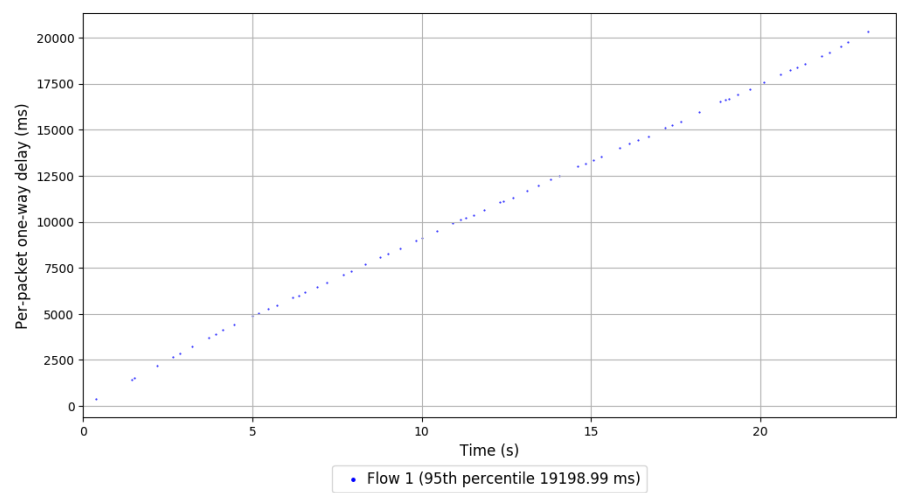
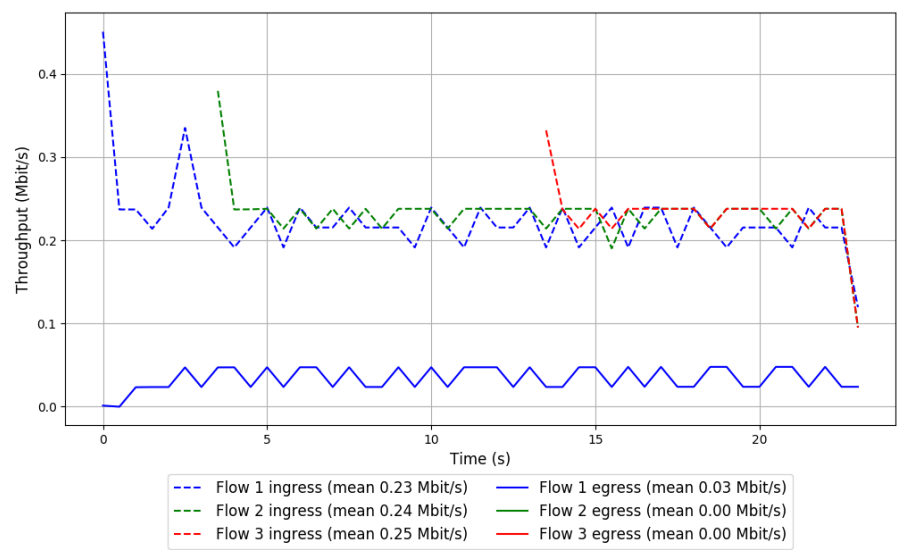
End at: 2017-09-22 15:17:51

Local clock offset: 0.211 ms

Remote clock offset: -2.051 ms



Run 3: Report of Indigo-cellular — Data Link

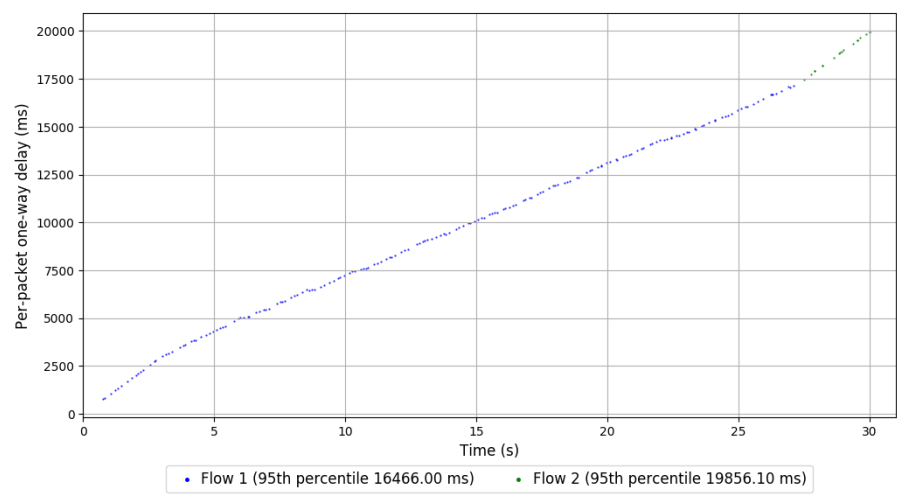
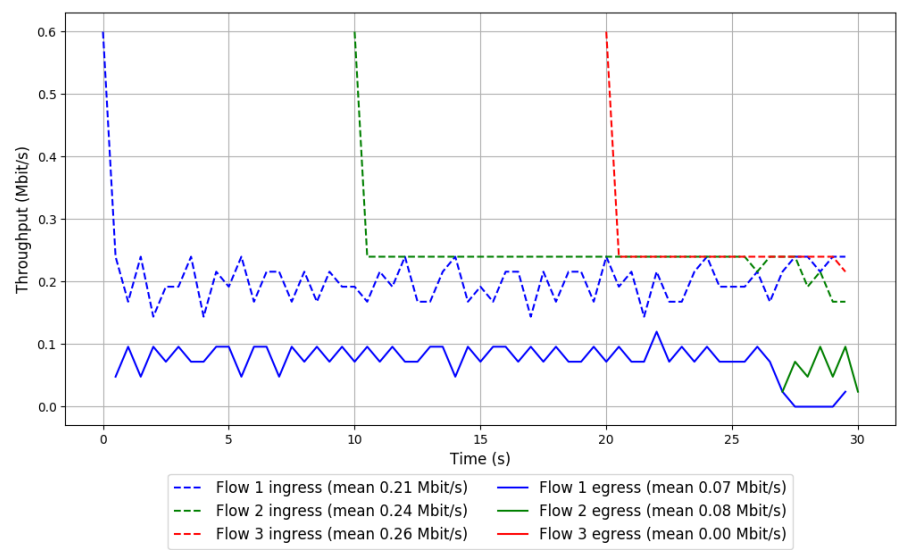


```
Run 1: Statistics of KohoCC

Start at: 2017-09-22 14:43:08
End at: 2017-09-22 14:43:38
Local clock offset: 0.146 ms
Remote clock offset: 0.068 ms

# Below is generated by plot.py at 2017-09-22 15:30:19
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 18816.179 ms
Loss rate: 82.48%
-- Flow 1:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 16465.998 ms
Loss rate: 64.80%
-- Flow 2:
Average throughput: 0.08 Mbit/s
95th percentile per-packet one-way delay: 19856.096 ms
Loss rate: 95.80%
-- Flow 3:
Average throughput: 0.00 Mbit/s
```

Run 1: Report of KohoCC — Data Link



Run 2: Statistics of KohoCC

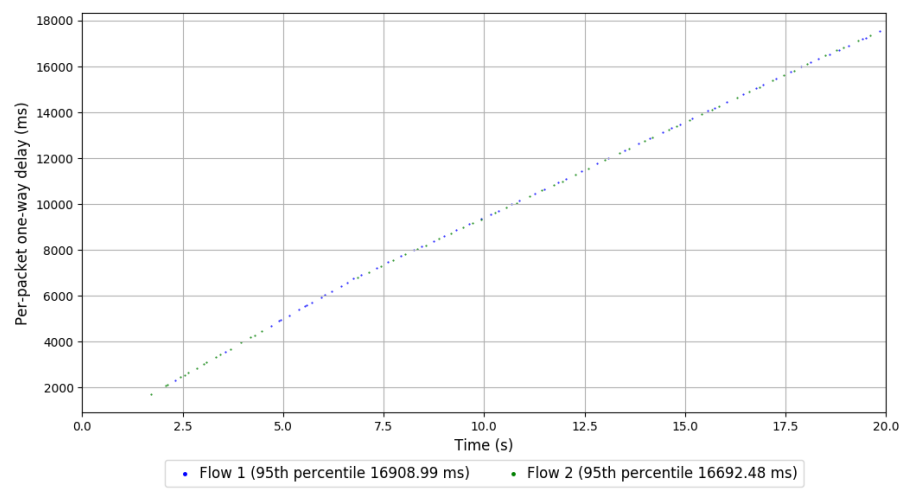
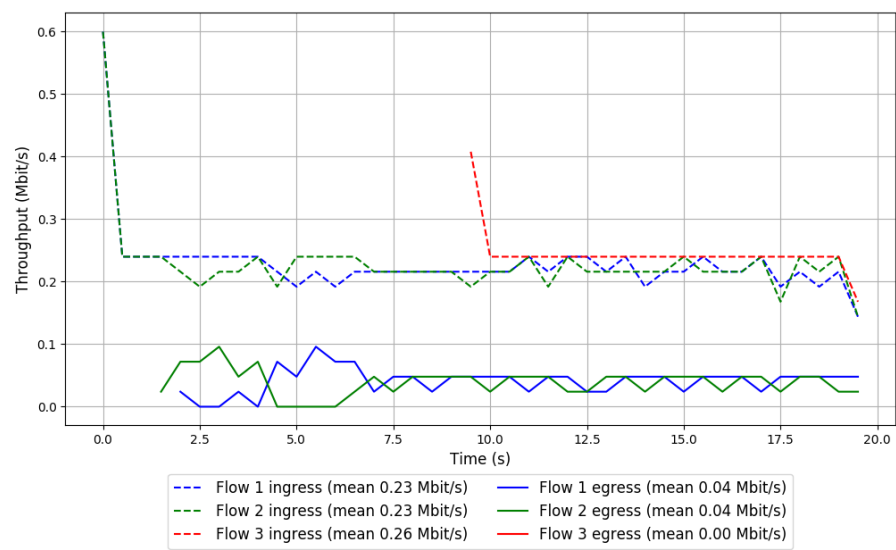
Start at: 2017-09-22 15:03:05

End at: 2017-09-22 15:03:35

Local clock offset: 0.102 ms

Remote clock offset: 0.203 ms

Run 2: Report of KohoCC — Data Link



Run 3: Statistics of KohoCC

Start at: 2017-09-22 15:23:04

End at: 2017-09-22 15:23:34

Local clock offset: 0.233 ms

Remote clock offset: 0.477 ms

# Below is generated by plot.py at 2017-09-22 15:30:19

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 24424.722 ms

Loss rate: 92.06%

-- Flow 1:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 24424.722 ms

Loss rate: 83.27%

-- Flow 2:

Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 3: Report of KohoCC — Data Link

