

## Pantheon Report

Generated at 2017-09-22 15:29:46 (UTC).

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

Repeated the test of 14 congestion control schemes 3 times.

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

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

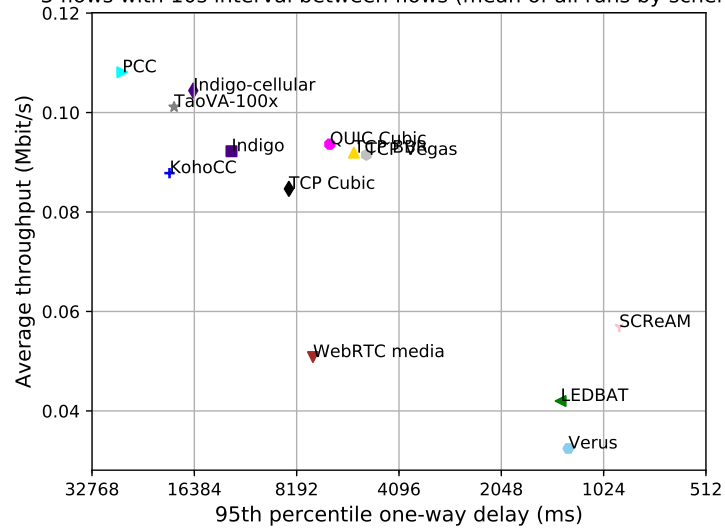
Tested BBR with qdisc of Fair Queuing (**fq**), and other schemes with the default Linux qdisc (**pfifo\_fast**).

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

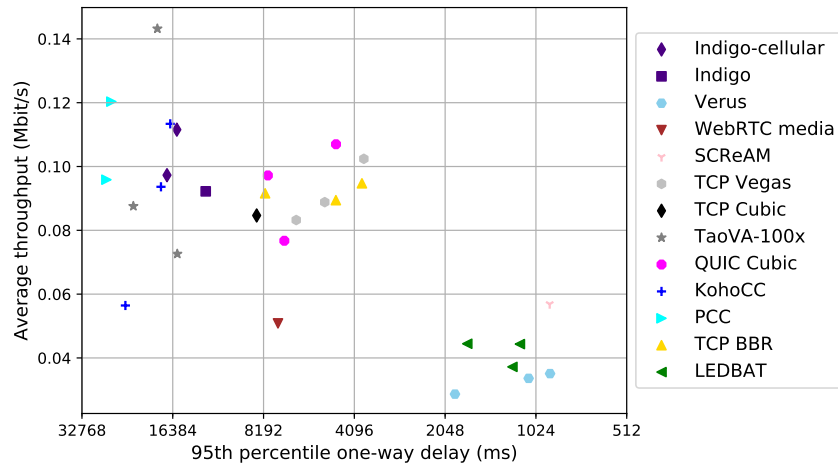
Git summary:

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



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



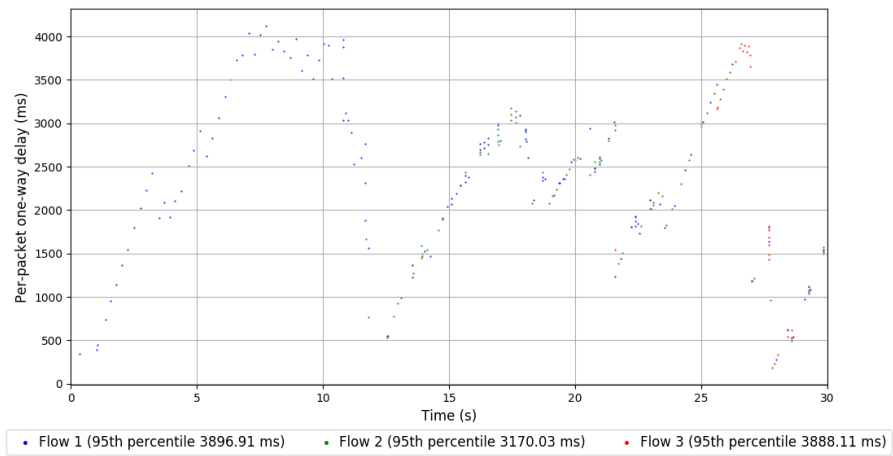
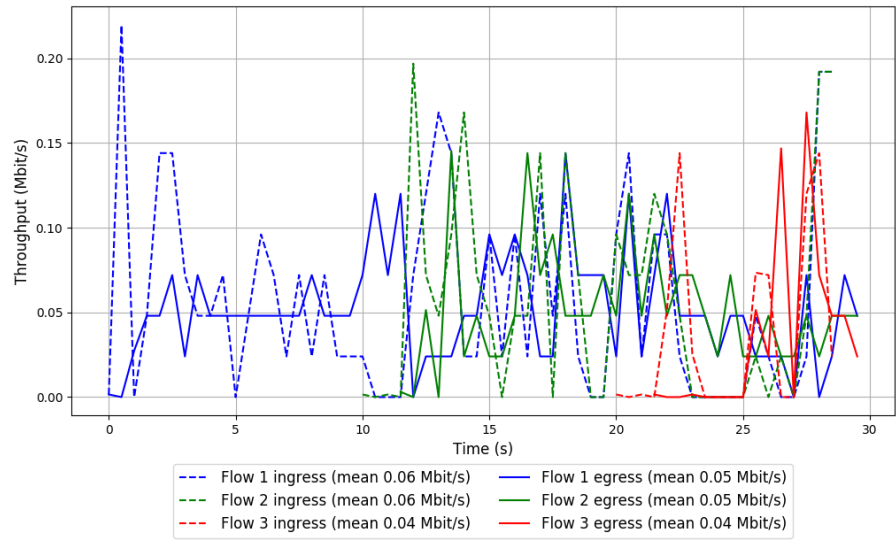
scheme	# runs	mean avg tput (Mbit/s)			mean 95th-%ile delay (ms)			mean loss rate (%)		
		flow 1	flow 2	flow 3	flow 1	flow 2	flow 3	flow 1	flow 2	flow 3
TCP BBR	3	0.06	0.04	0.01	5364.69	5566.02	5701.11	10.54	14.57	50.61
TCP Cubic	1	0.08	0.00	0.00	8574.94	8883.34	8831.11	36.31	60.90	83.89
LEDBAT	3	0.02	0.01	0.04	1276.52	1411.99	1598.91	1.88	1.05	1.15
PCC	2	0.11	0.00	N/A	26685.74	N/A	N/A	99.73	N/A	N/A
QUIC Cubic	3	0.09	0.00	0.00	6579.45	4731.67	5172.74	21.27	0.00	38.01
SCReAM	1	0.02	0.03	0.05	1097.23	568.56	753.45	0.58	0.92	2.08
WebRTC media	1	0.04	0.01	0.00	7440.27	5980.07	5637.15	0.00	40.08	36.73
Sprout	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TaoVA-100x	3	0.10	0.00	31.84	18925.36	9856.64	7169.18	60.60	72.73	75.00
TCP Vegas	3	0.06	0.05	0.00	5137.17	5089.56	4139.66	6.53	18.37	47.97
Verus	3	0.02	0.02	0.02	1252.21	1145.97	1178.79	2.65	5.44	7.64
Indigo	1	0.06	0.07	0.11	12810.24	8055.06	6996.71	18.19	34.02	69.16
Indigo-cellular	2	0.08	0.06	0.00	15168.45	17198.62	N/A	60.88	87.62	N/A
KohoCC	3	0.08	0.05	0.00	18819.31	18143.24	N/A	65.75	89.68	N/A

Run 1: Statistics of TCP BBR

Start at: 2017-09-22 13:29:13  
End at: 2017-09-22 13:29:43  
Local clock offset: 0.101 ms  
Remote clock offset: -0.433 ms

# Below is generated by plot.py at 2017-09-22 15:29:28  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 3864.965 ms  
Loss rate: 8.99%  
-- Flow 1:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 3896.912 ms  
Loss rate: 7.18%  
-- Flow 2:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 3170.027 ms  
Loss rate: 11.19%  
-- Flow 3:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 3888.111 ms  
Loss rate: 10.95%

# Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2017-09-22 13:49:56

End at: 2017-09-22 13:50:26

Local clock offset: 0.005 ms

Remote clock offset: -0.07 ms

# Below is generated by plot.py at 2017-09-22 15:29:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 8095.225 ms

Loss rate: 11.64%

-- Flow 1:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 7481.355 ms

Loss rate: 11.34%

-- Flow 2:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 8654.838 ms

Loss rate: 12.05%

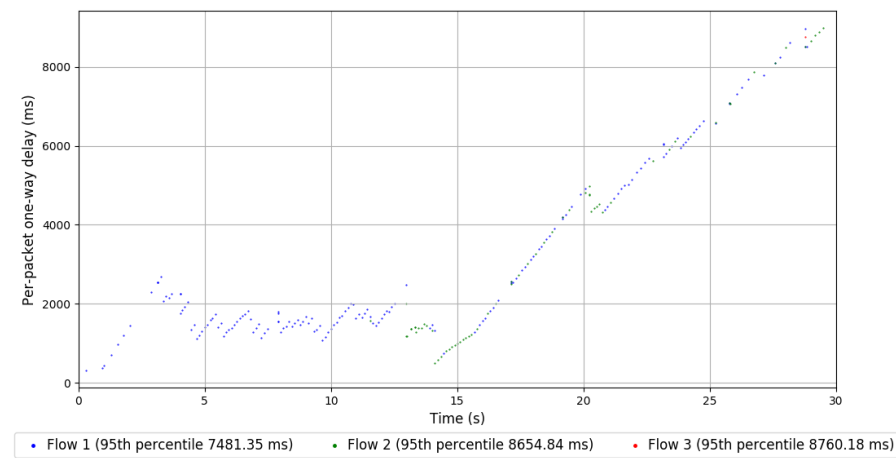
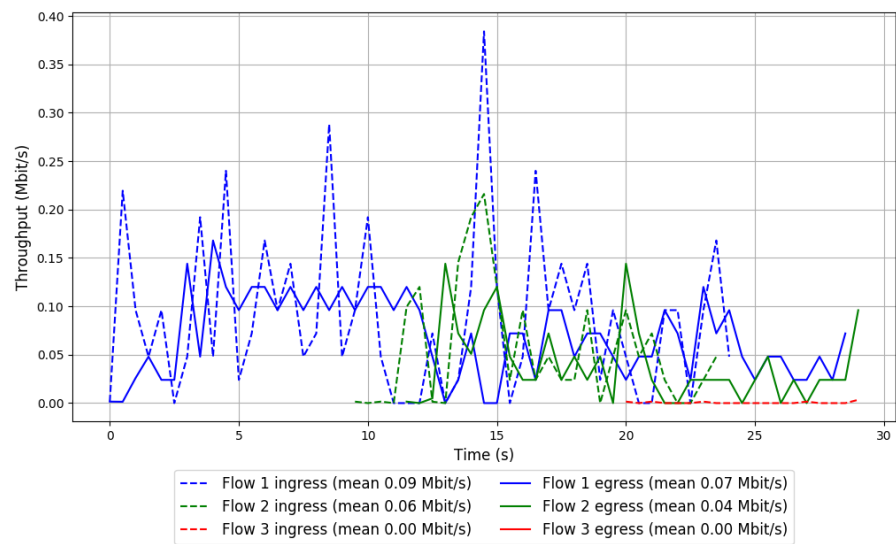
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8760.180 ms

Loss rate: 83.89%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2017-09-22 14:10:11

End at: 2017-09-22 14:10:41

Local clock offset: 0.098 ms

Remote clock offset: 0.165 ms

# Below is generated by plot.py at 2017-09-22 15:29:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 4715.795 ms

Loss rate: 15.77%

-- Flow 1:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 4715.795 ms

Loss rate: 13.10%

-- Flow 2:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 4873.196 ms

Loss rate: 20.46%

-- Flow 3:

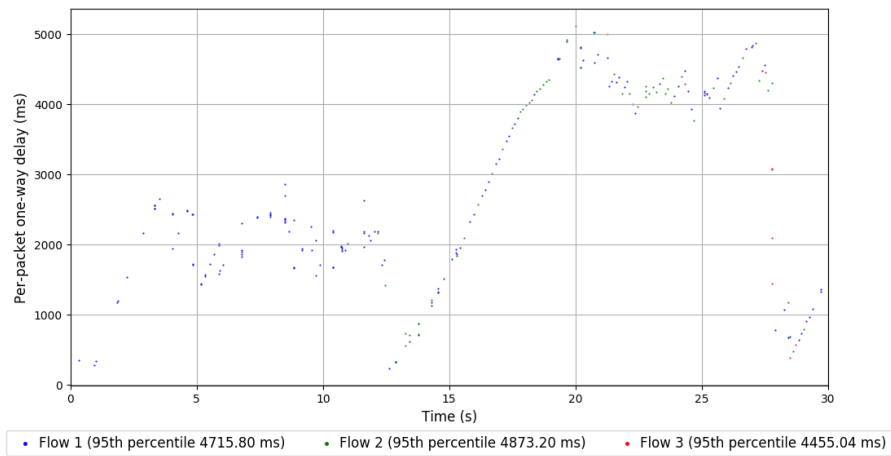
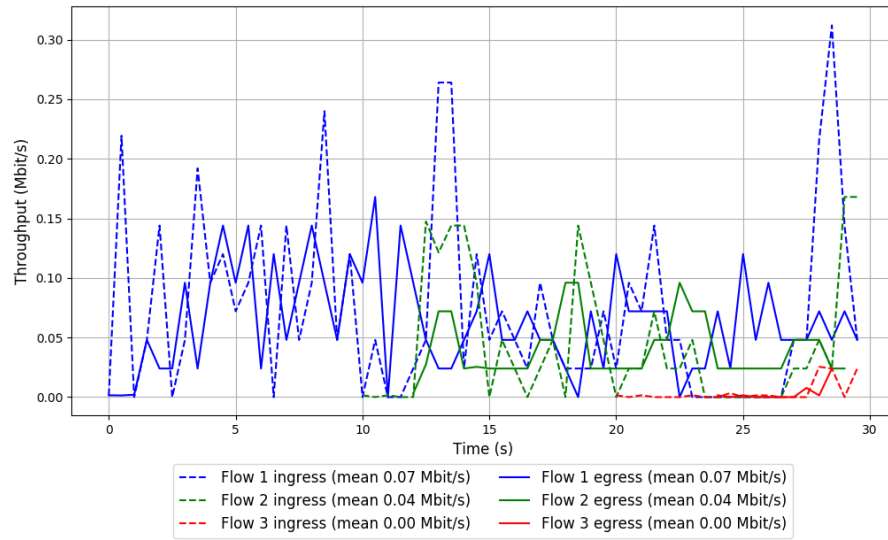
Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 4455.037 ms

Loss rate: 56.99%



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



Run 1: Statistics of TCP Cubic

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/c

Run 1: Report of TCP Cubic — Data Link

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Run 2: Statistics of TCP Cubic

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/c

Run 2: Report of TCP Cubic — Data Link

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Run 3: Statistics of TCP Cubic

Start at: 2017-09-22 14:21:57

End at: 2017-09-22 14:22:27

Local clock offset: 0.054 ms

Remote clock offset: -0.17 ms

# Below is generated by plot.py at 2017-09-22 15:29:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 8634.226 ms

Loss rate: 36.86%

-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 8574.945 ms

Loss rate: 36.31%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8883.338 ms

Loss rate: 60.90%

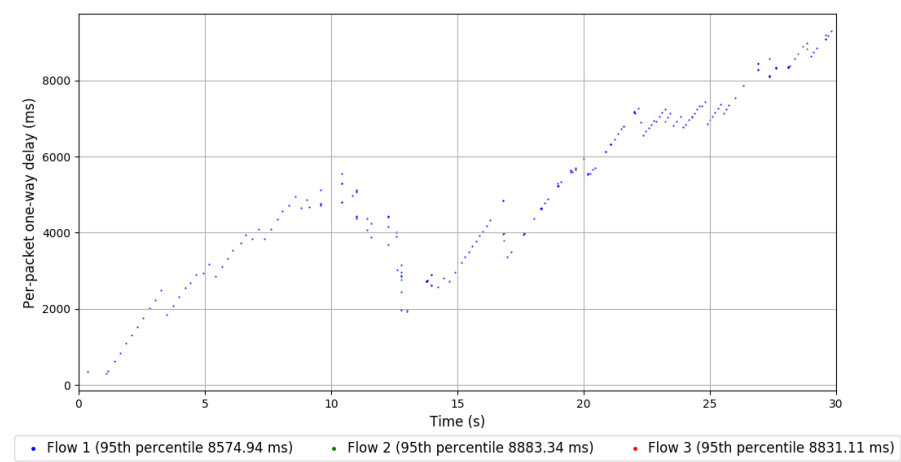
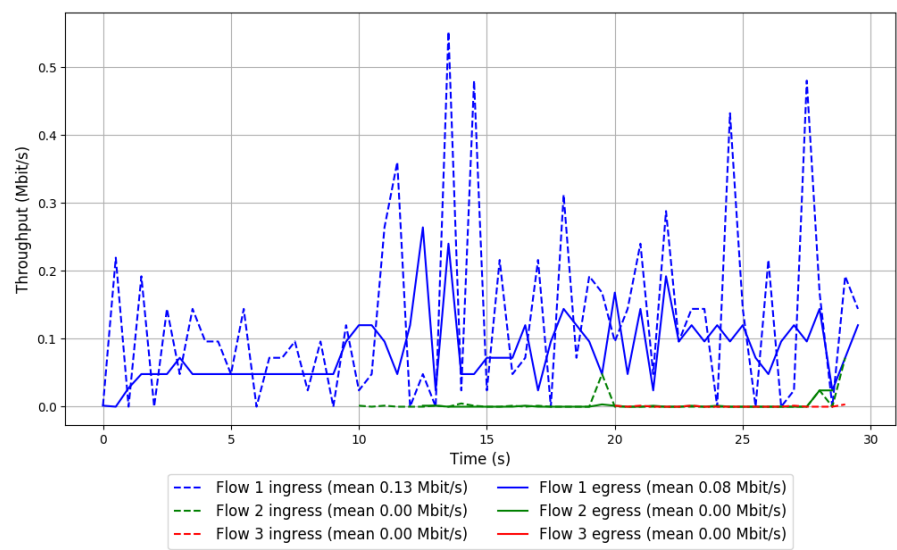
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 8831.111 ms

Loss rate: 83.89%

Run 3: Report of TCP Cubic — Data Link



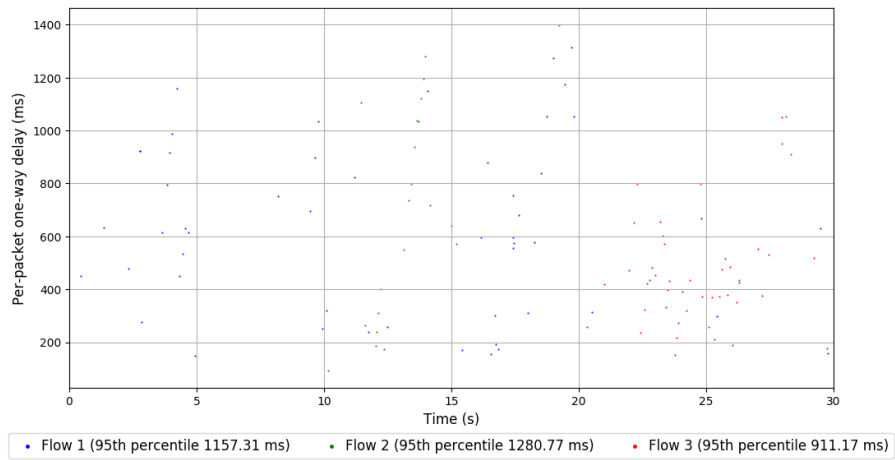
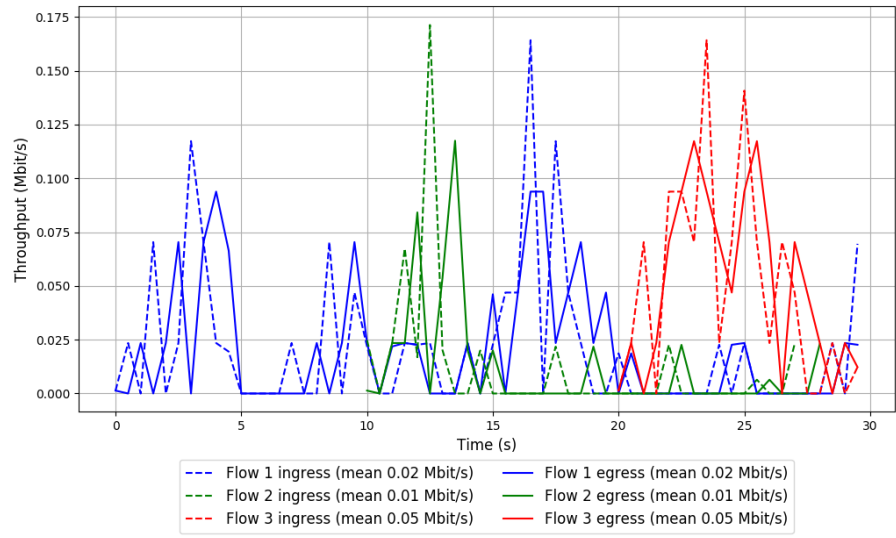
Run 1: Statistics of LEDBAT

Start at: 2017-09-22 13:45:44  
End at: 2017-09-22 13:46:14  
Local clock offset: 0.002 ms  
Remote clock offset: -0.728 ms

# Below is generated by plot.py at 2017-09-22 15:29:28  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 1157.310 ms  
Loss rate: 1.77%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 1157.310 ms  
Loss rate: 3.81%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 1280.771 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 911.172 ms  
Loss rate: 0.00%



## Run 1: Report of LEDBAT — Data Link



Run 2: Statistics of LEDBAT

Start at: 2017-09-22 14:06:12

End at: 2017-09-22 14:06:42

Local clock offset: 0.102 ms

Remote clock offset: -2.39 ms

# Below is generated by plot.py at 2017-09-22 15:29:28

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 1729.650 ms

Loss rate: 2.62%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1449.449 ms

Loss rate: 1.84%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1729.628 ms

Loss rate: 3.15%

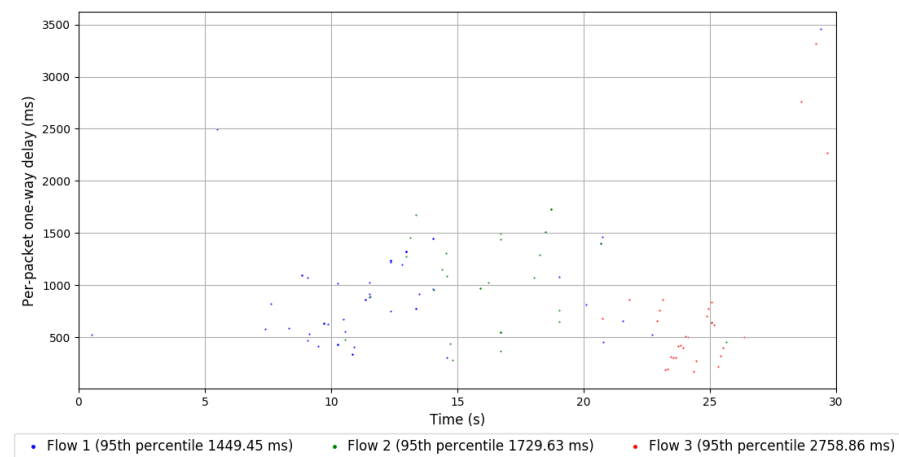
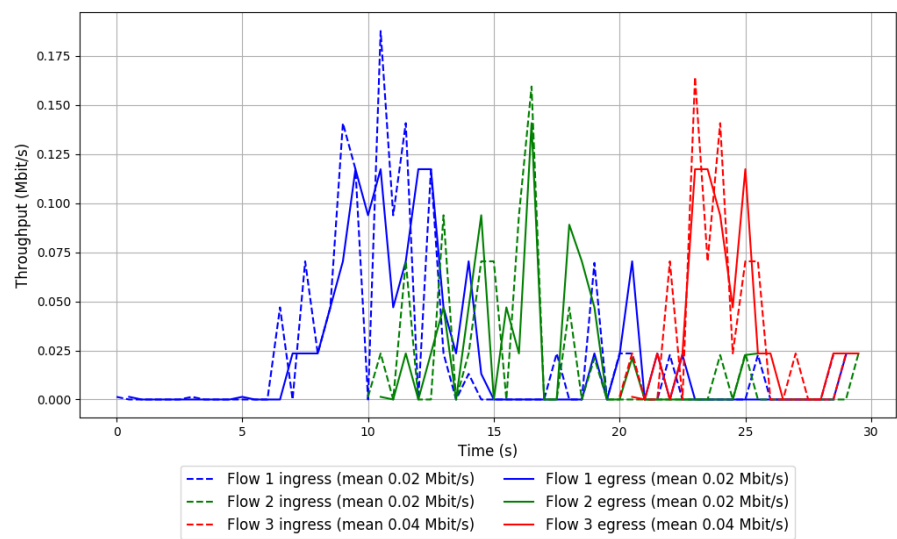
-- Flow 3:

Average throughput: 0.04 Mbit/s

95th percentile per-packet one-way delay: 2758.865 ms

Loss rate: 3.44%

Run 2: Report of LEDBAT — Data Link

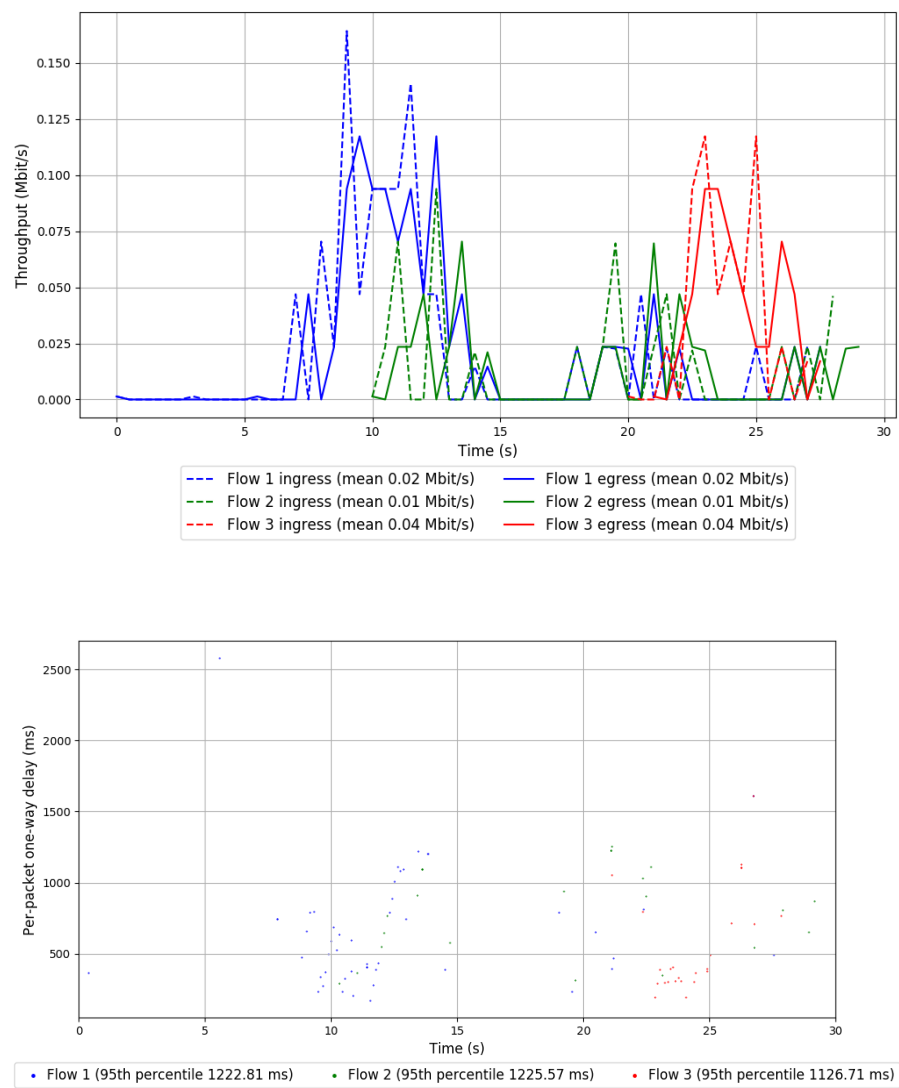


Run 3: Statistics of LEDBAT

Start at: 2017-09-22 14:26:19  
End at: 2017-09-22 14:26:49  
Local clock offset: 0.051 ms  
Remote clock offset: -0.104 ms

# Below is generated by plot.py at 2017-09-22 15:29:28  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 1225.341 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 1222.805 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 1225.574 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 1126.707 ms  
Loss rate: 0.00%

Run 3: Report of LEDBAT — Data Link

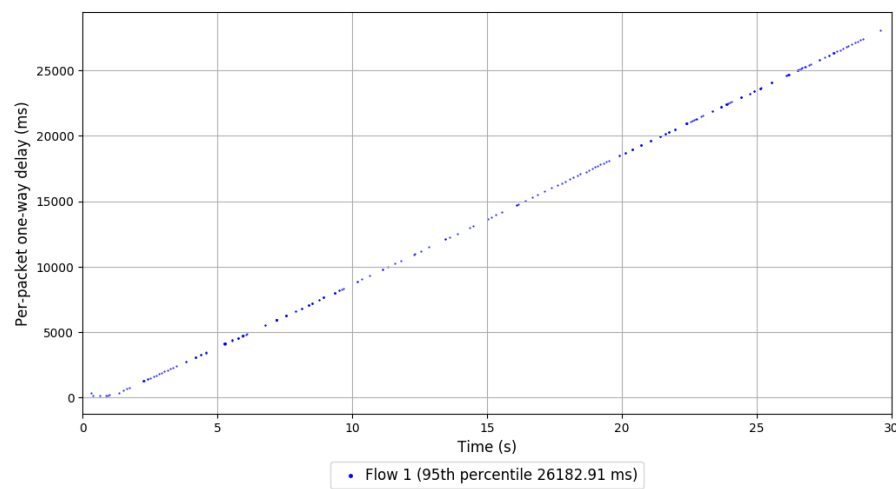
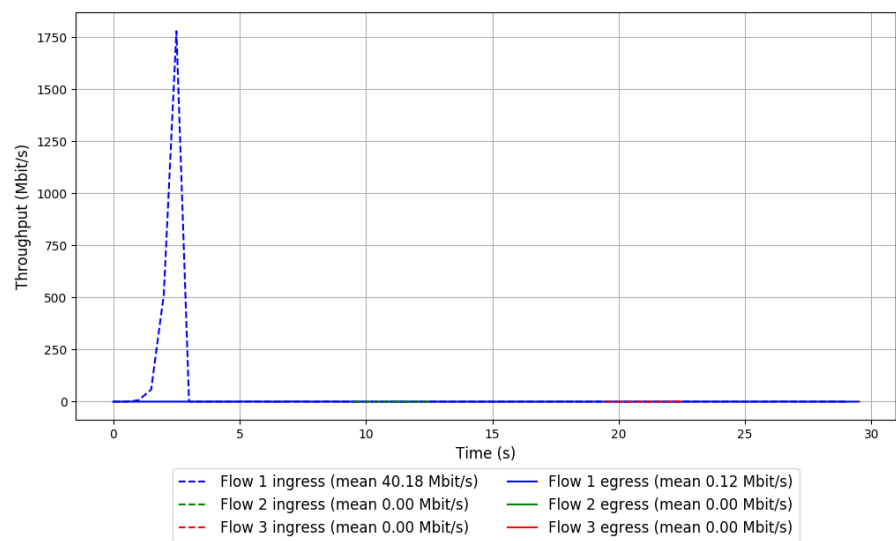


Run 1: Statistics of PCC

Start at: 2017-09-22 13:37:57  
End at: 2017-09-22 13:38:27  
Local clock offset: 0.091 ms  
Remote clock offset: -0.751 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.12 Mbit/s  
95th percentile per-packet one-way delay: 26182.908 ms  
Loss rate: 99.70%  
-- Flow 1:  
Average throughput: 0.12 Mbit/s  
95th percentile per-packet one-way delay: 26182.908 ms  
Loss rate: 99.70%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 1: Report of PCC — Data Link



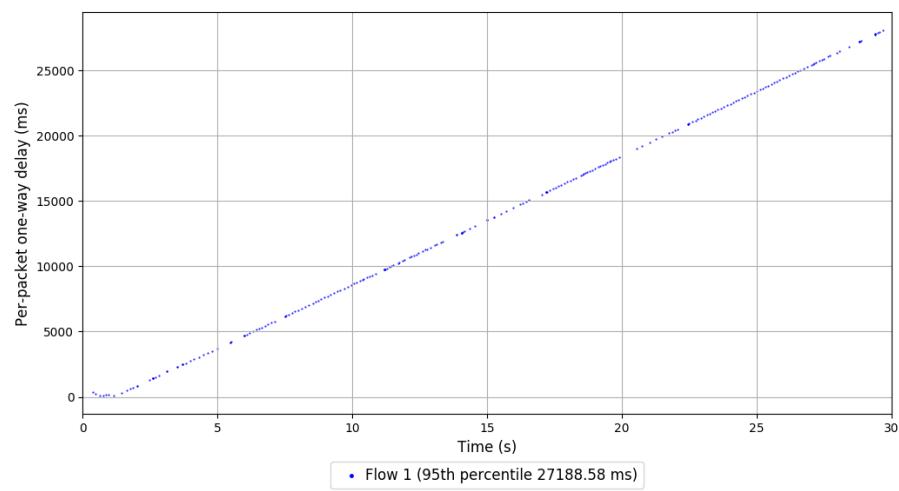
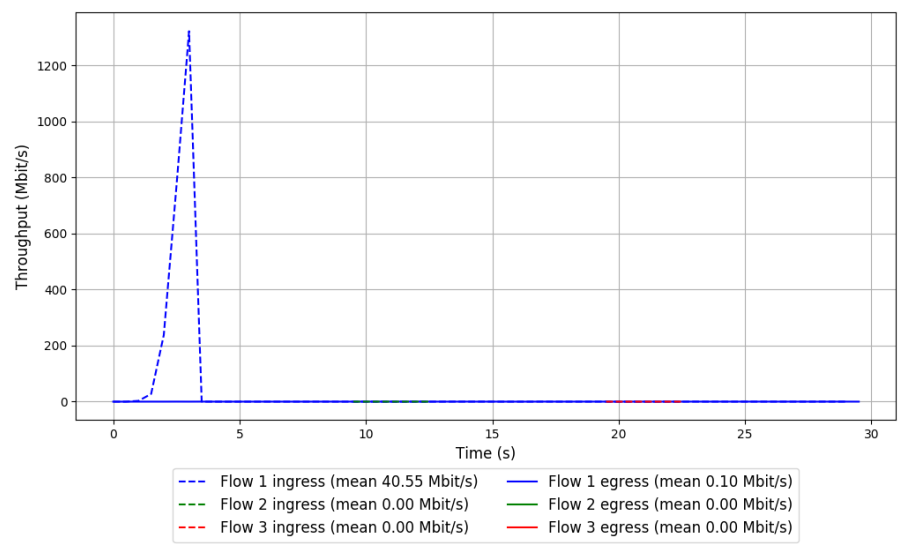
Run 2: Statistics of PCC

Start at: 2017-09-22 13:58:24  
End at: 2017-09-22 13:58:54  
Local clock offset: 0.102 ms  
Remote clock offset: -2.441 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 27188.580 ms  
Loss rate: 99.76%  
-- Flow 1:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 27188.580 ms  
Loss rate: 99.76%  
-- 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

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/p

### Run 3: Report of PCC — Data Link

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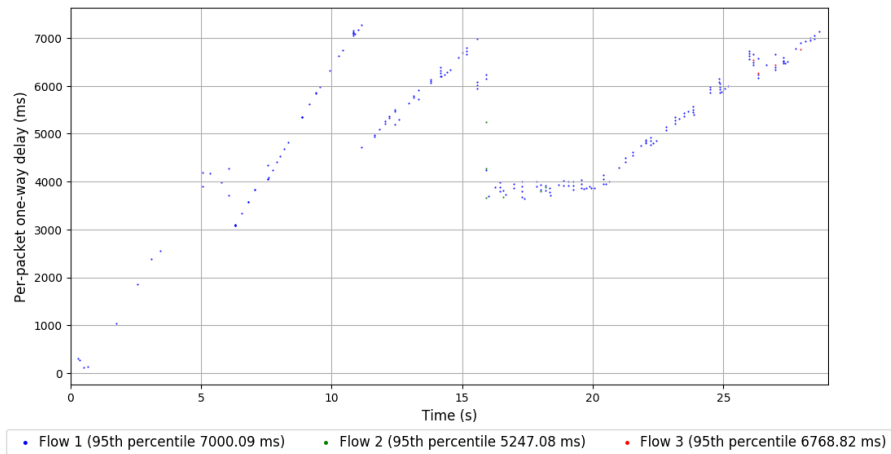
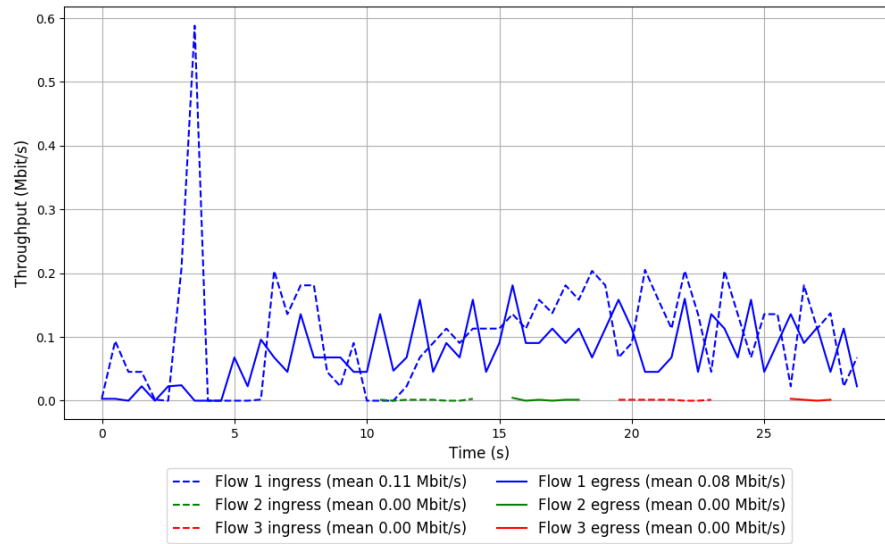
Figure is missing

Run 1: Statistics of QUIC Cubic

Start at: 2017-09-22 13:48:30  
End at: 2017-09-22 13:49:00  
Local clock offset: 0.083 ms  
Remote clock offset: -0.667 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 6990.144 ms  
Loss rate: 28.63%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 7000.094 ms  
Loss rate: 28.66%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 5247.077 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 6768.816 ms  
Loss rate: 33.33%

# Run 1: Report of QUIC Cubic — Data Link



Run 2: Statistics of QUIC Cubic

Start at: 2017-09-22 14:08:51

End at: 2017-09-22 14:09:21

Local clock offset: 0.01 ms

Remote clock offset: 0.232 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 7927.229 ms

Loss rate: 25.74%

-- Flow 1:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 8026.839 ms

Loss rate: 17.42%

-- Flow 2:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 4576.709 ms

Loss rate: 0.00%

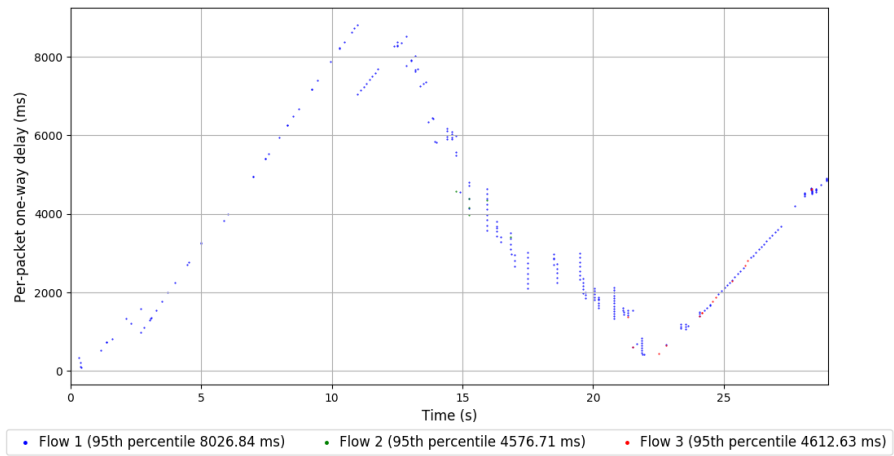
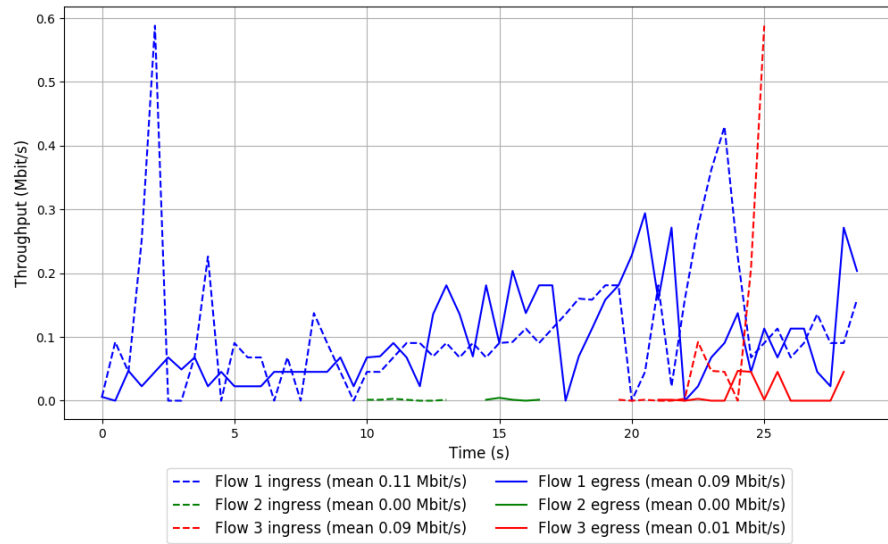
-- Flow 3:

Average throughput: 0.01 Mbit/s

95th percentile per-packet one-way delay: 4612.628 ms

Loss rate: 80.71%

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



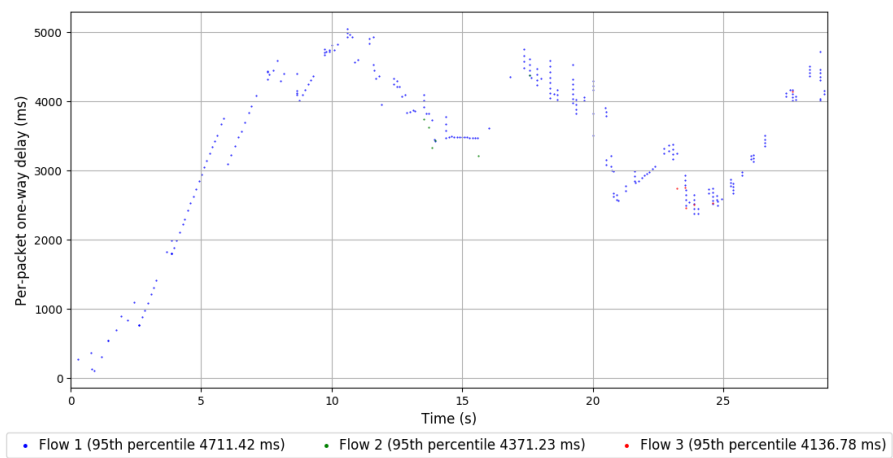
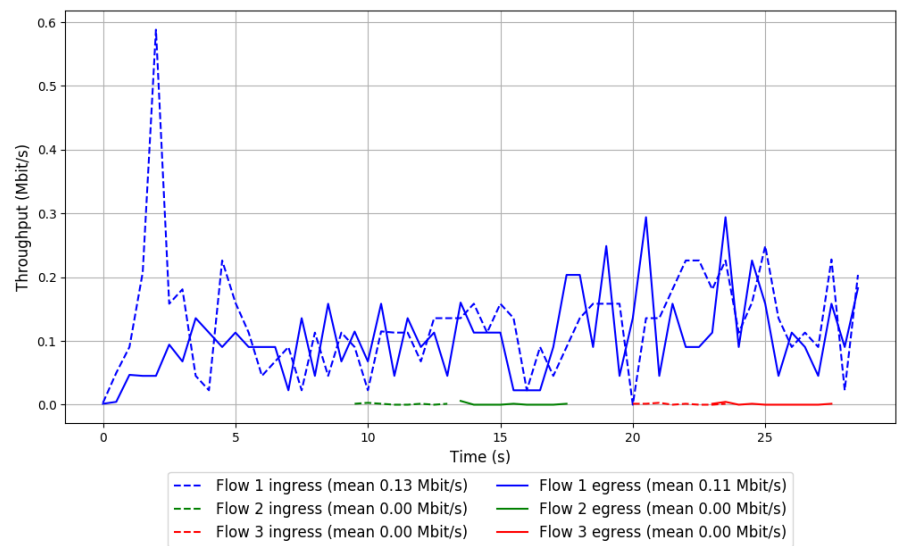
Run 3: Statistics of QUIC Cubic

Start at: 2017-09-22 14:28:59  
End at: 2017-09-22 14:29:29  
Local clock offset: 0.053 ms  
Remote clock offset: -0.202 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 4711.417 ms  
Loss rate: 17.67%  
-- Flow 1:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 4711.417 ms  
Loss rate: 17.72%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 4371.226 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 4136.781 ms  
Loss rate: 0.00%



Run 3: Report of QUIC Cubic — Data Link



Run 1: Statistics of SCReAM

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/s

Run 1: Report of SReAM — Data Link

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Run 2: Statistics of SCReAM

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/s

Run 2: Report of SReAM — Data Link

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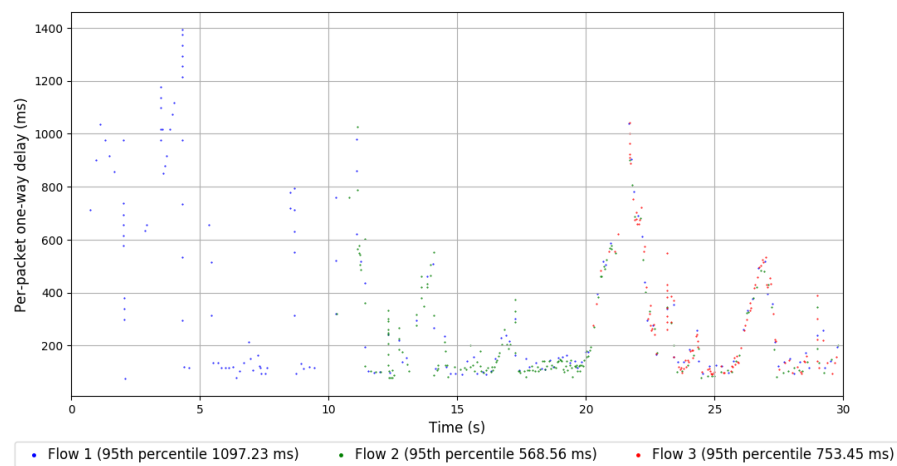
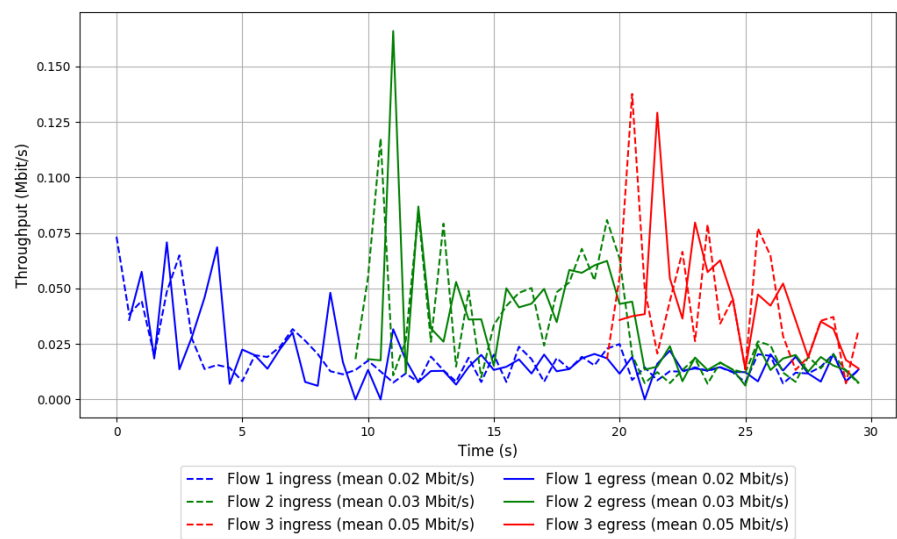
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Run 3: Statistics of SCReAM

Start at: 2017-09-22 14:20:37  
End at: 2017-09-22 14:21:07  
Local clock offset: 0.052 ms  
Remote clock offset: -2.375 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 921.774 ms  
Loss rate: 1.12%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 1097.230 ms  
Loss rate: 0.58%  
-- Flow 2:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 568.562 ms  
Loss rate: 0.92%  
-- Flow 3:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 753.453 ms  
Loss rate: 2.08%

Run 3: Report of SReAM — Data Link



Run 1: Statistics of WebRTC media

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/v



Run 1: Report of WebRTC media — Data Link

Figure is missing

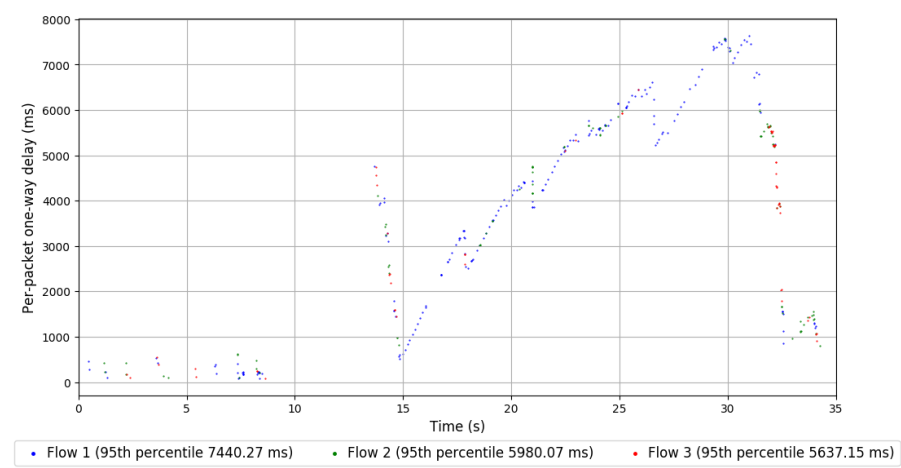
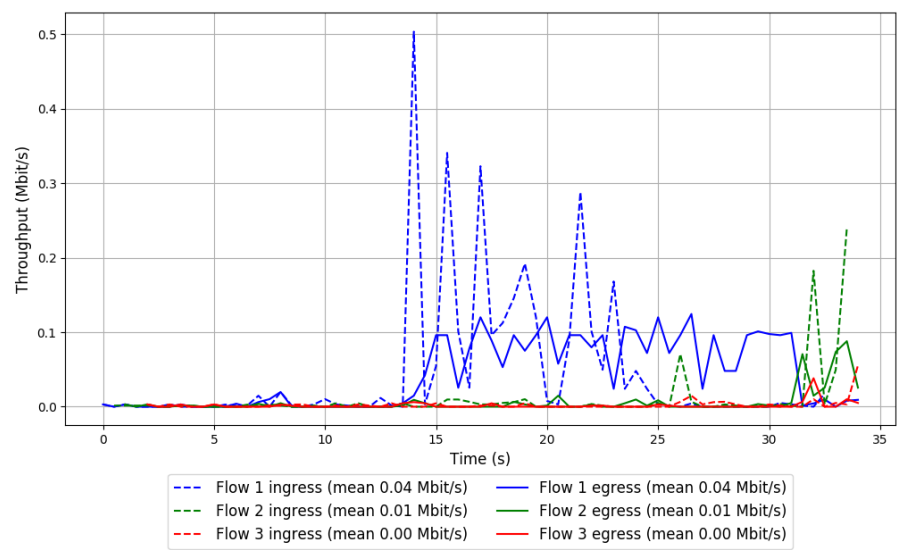
Figure is missing

Run 2: Statistics of WebRTC media

Start at: 2017-09-22 13:57:04  
End at: 2017-09-22 13:57:34  
Local clock offset: 0.01 ms  
Remote clock offset: -2.464 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 7336.426 ms  
Loss rate: 8.59%  
-- Flow 1:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 7440.275 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 5980.066 ms  
Loss rate: 40.08%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 5637.153 ms  
Loss rate: 36.73%

Run 2: Report of WebRTC media — Data Link



Run 3: Statistics of WebRTC media

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/v

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

Figure is missing

Figure is missing

Run 1: Statistics of Sprout

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/s

Run 1: Report of Sprout — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Sprout

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/s



Run 2: Report of Sprout — Data Link

Figure is missing

Figure is missing

Run 3: Statistics of Sprout

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/s

Run 3: Report of Sprout — Data Link

Figure is missing

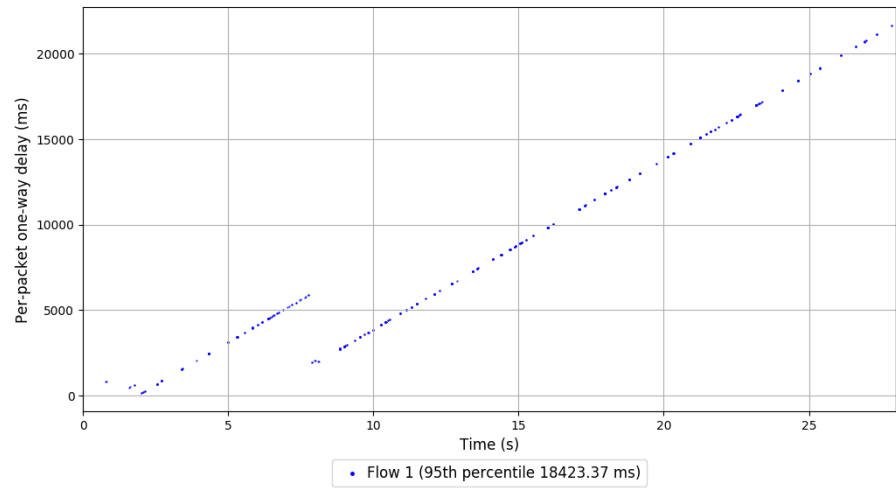
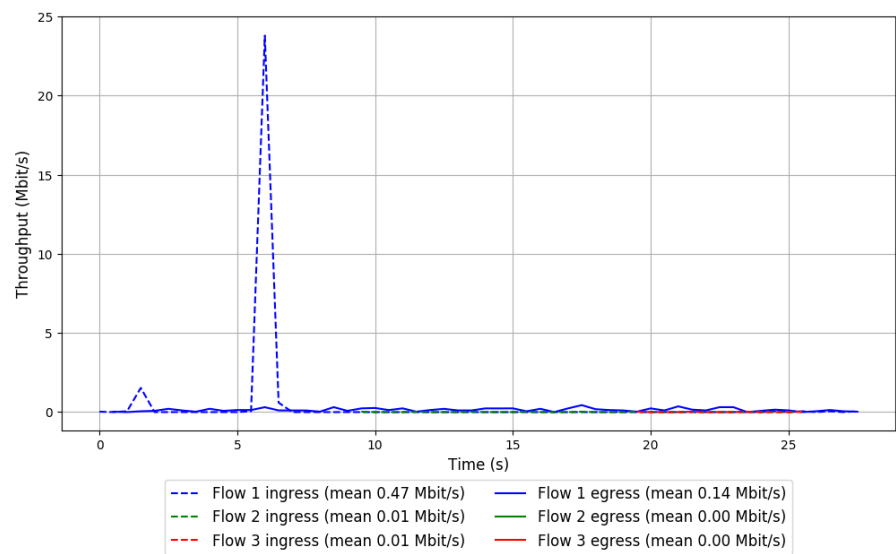
Figure is missing

Run 1: Statistics of TaoVA-100x

Start at: 2017-09-22 13:34:55  
End at: 2017-09-22 13:35:25  
Local clock offset: 0.071 ms  
Remote clock offset: -0.752 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.14 Mbit/s  
95th percentile per-packet one-way delay: 18423.372 ms  
Loss rate: 70.86%  
-- Flow 1:  
Average throughput: 0.14 Mbit/s  
95th percentile per-packet one-way delay: 18423.372 ms  
Loss rate: 70.48%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

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

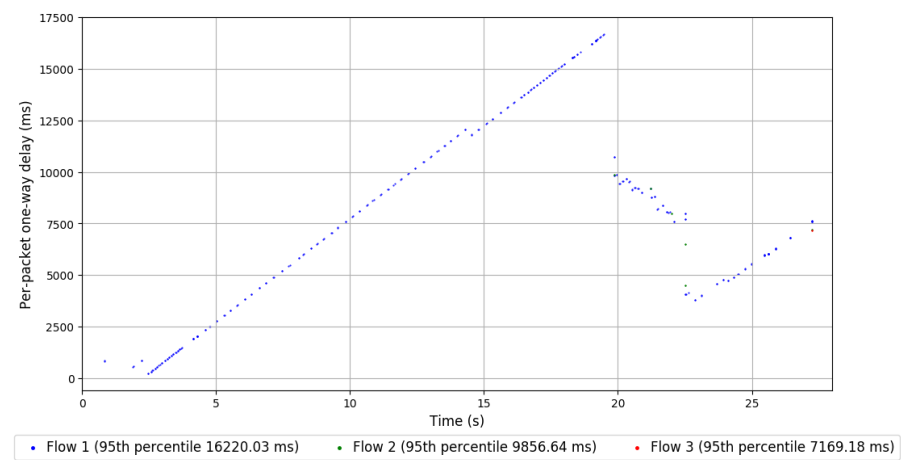
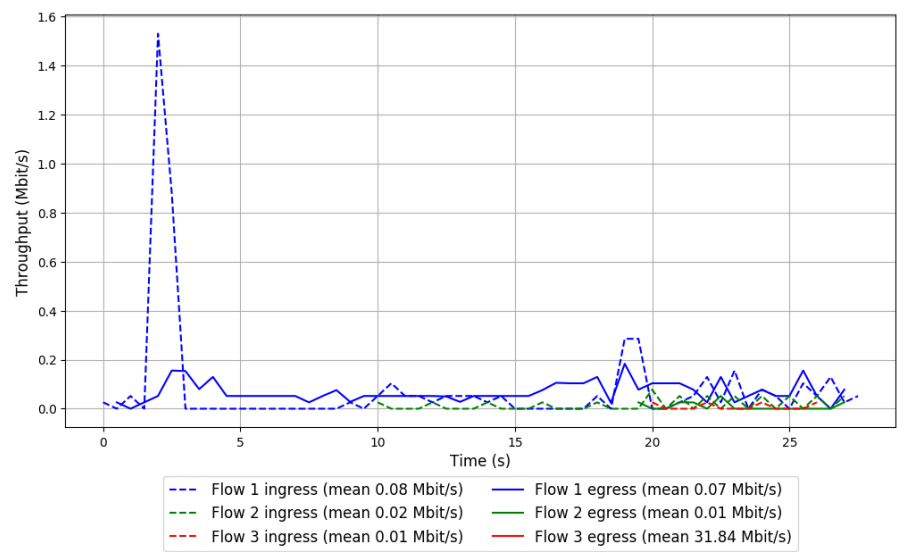


Run 2: Statistics of TaoVA-100x

Start at: 2017-09-22 13:55:37  
End at: 2017-09-22 13:56:07  
Local clock offset: -0.01 ms  
Remote clock offset: -2.602 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 15824.931 ms  
Loss rate: 26.37%  
-- Flow 1:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 16220.033 ms  
Loss rate: 19.43%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 9856.642 ms  
Loss rate: 72.73%  
-- Flow 3:  
Average throughput: 31.84 Mbit/s  
95th percentile per-packet one-way delay: 7169.178 ms  
Loss rate: 75.00%

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



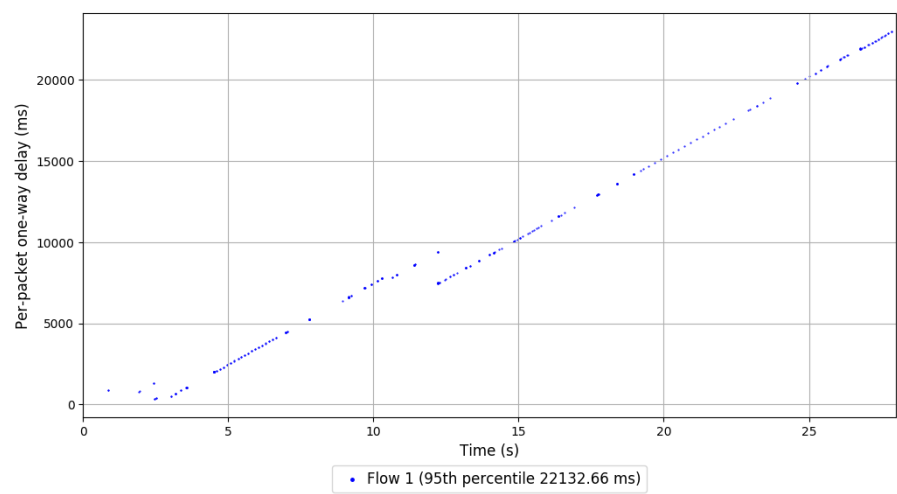
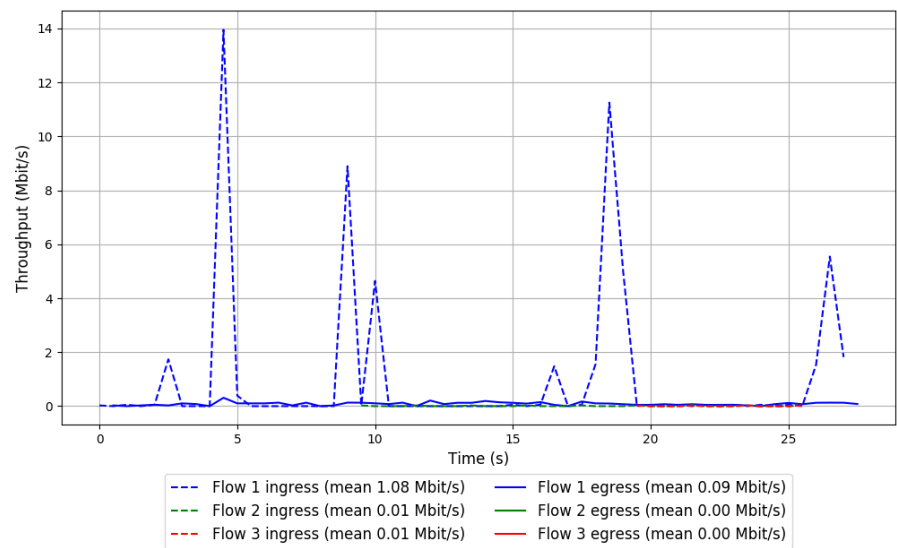
Run 3: Statistics of TaoVA-100x

Start at: 2017-09-22 14:15:53  
End at: 2017-09-22 14:16:23  
Local clock offset: 0.133 ms  
Remote clock offset: -0.208 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 22132.661 ms  
Loss rate: 91.95%  
-- Flow 1:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 22132.661 ms  
Loss rate: 91.90%  
-- Flow 2:  
Average throughput: 0.00 Mbit/s  
-- Flow 3:  
Average throughput: 0.00 Mbit/s



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

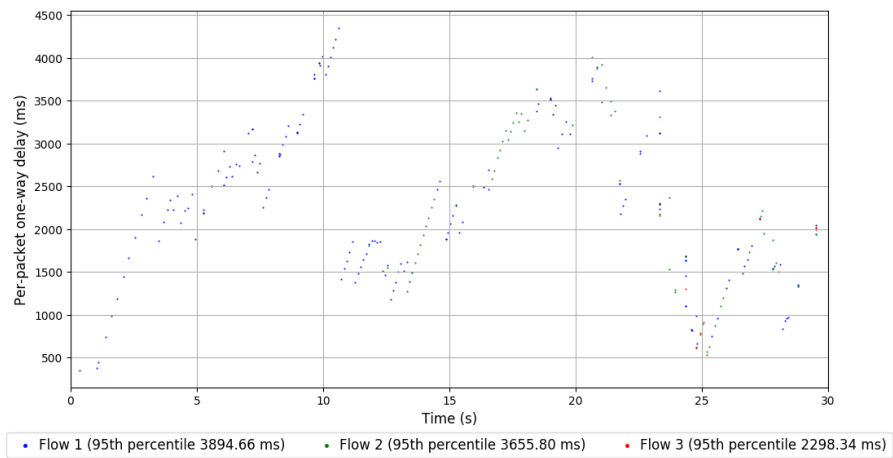
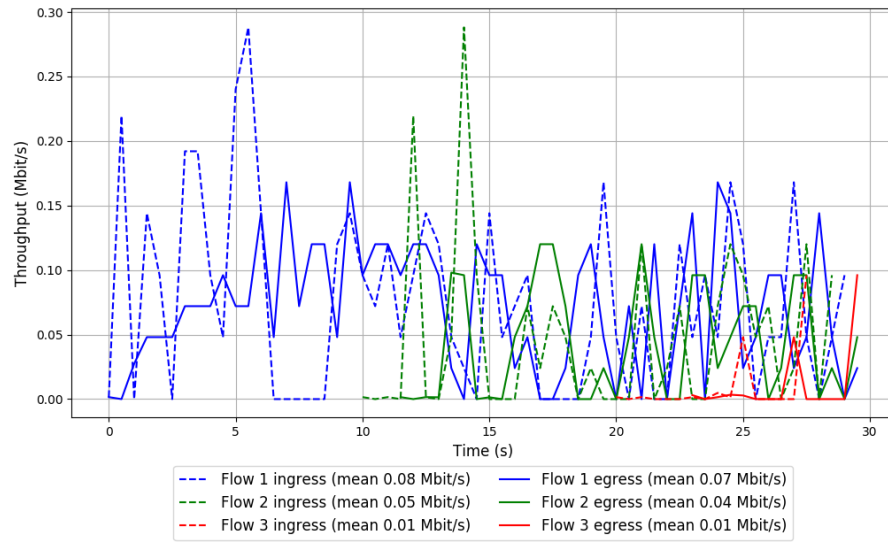


Run 1: Statistics of TCP Vegas

Start at: 2017-09-22 13:30:33  
End at: 2017-09-22 13:31:03  
Local clock offset: 0.018 ms  
Remote clock offset: -2.845 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.10 Mbit/s  
95th percentile per-packet one-way delay: 3809.380 ms  
Loss rate: 6.04%  
-- Flow 1:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 3894.662 ms  
Loss rate: 4.32%  
-- Flow 2:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 3655.805 ms  
Loss rate: 10.91%  
-- Flow 3:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 2298.343 ms  
Loss rate: 0.00%

# Run 1: Report of TCP Vegas — Data Link



Run 2: Statistics of TCP Vegas

Start at: 2017-09-22 13:51:16

End at: 2017-09-22 13:51:46

Local clock offset: 0.011 ms

Remote clock offset: -0.41 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 6383.008 ms

Loss rate: 18.92%

-- Flow 1:

Average throughput: 0.05 Mbit/s

95th percentile per-packet one-way delay: 6383.008 ms

Loss rate: 8.32%

-- Flow 2:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 6382.338 ms

Loss rate: 28.60%

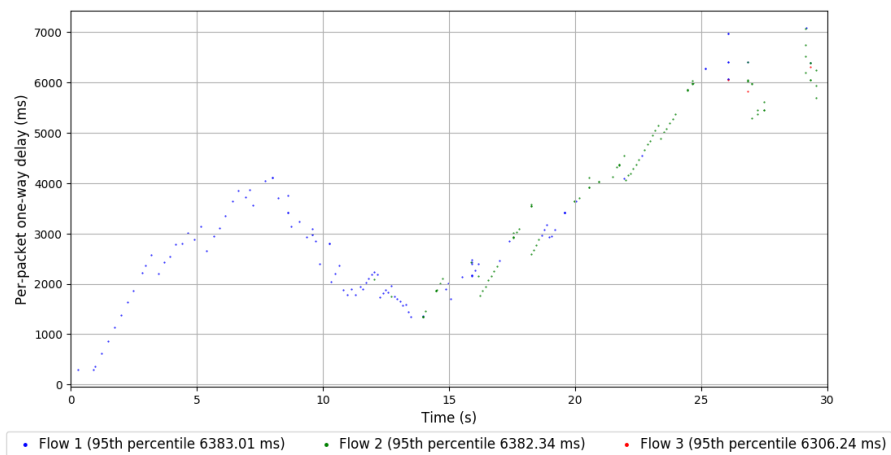
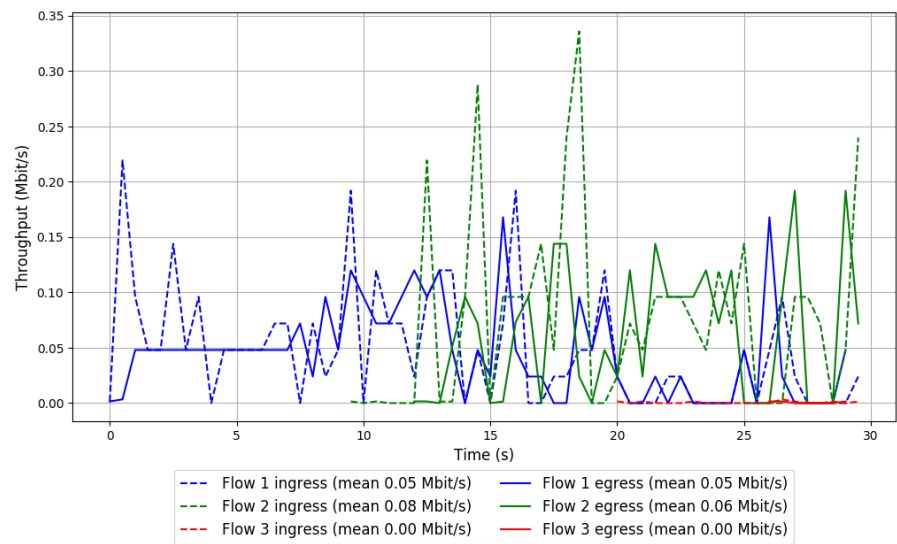
-- Flow 3:

Average throughput: 0.00 Mbit/s

95th percentile per-packet one-way delay: 6306.239 ms

Loss rate: 62.30%

Run 2: Report of TCP Vegas — Data Link

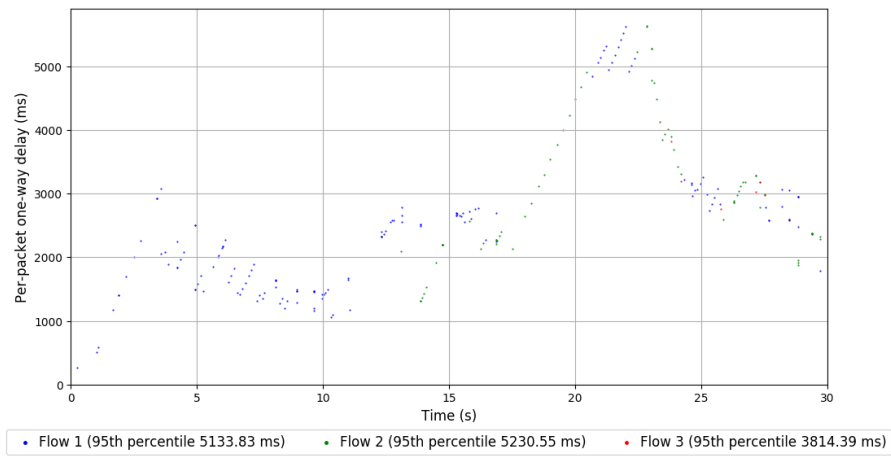
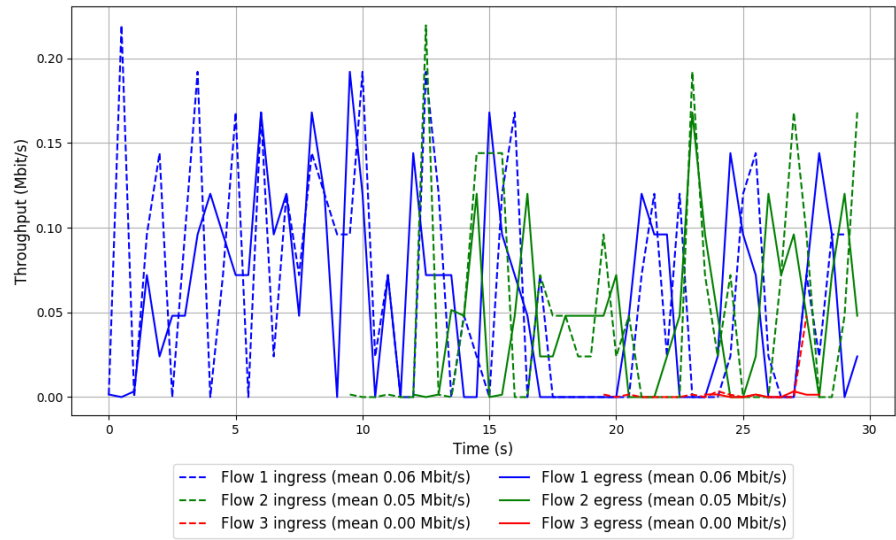


Run 3: Statistics of TCP Vegas

Start at: 2017-09-22 14:11:31  
End at: 2017-09-22 14:12:01  
Local clock offset: 0.026 ms  
Remote clock offset: -2.277 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 5133.830 ms  
Loss rate: 10.66%  
-- Flow 1:  
Average throughput: 0.06 Mbit/s  
95th percentile per-packet one-way delay: 5133.830 ms  
Loss rate: 6.95%  
-- Flow 2:  
Average throughput: 0.05 Mbit/s  
95th percentile per-packet one-way delay: 5230.545 ms  
Loss rate: 15.60%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s  
95th percentile per-packet one-way delay: 3814.387 ms  
Loss rate: 81.61%

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



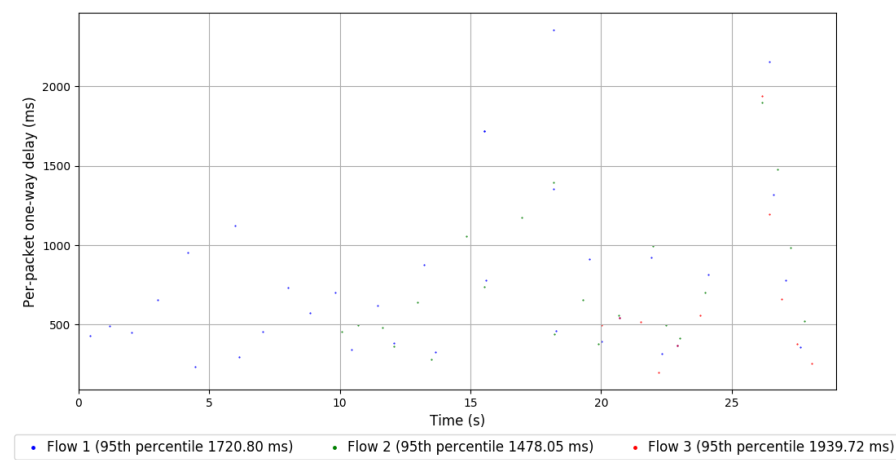
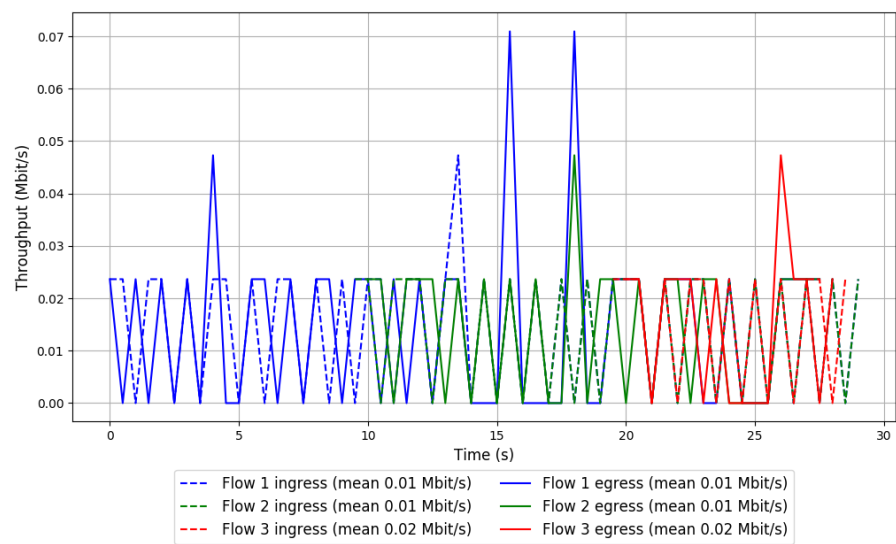
Run 1: Statistics of Verus

Start at: 2017-09-22 13:47:05  
End at: 2017-09-22 13:47:35  
Local clock offset: 0.003 ms  
Remote clock offset: -2.699 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.03 Mbit/s  
95th percentile per-packet one-way delay: 1899.659 ms  
Loss rate: 6.94%  
-- Flow 1:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 1720.800 ms  
Loss rate: 5.56%  
-- Flow 2:  
Average throughput: 0.01 Mbit/s  
95th percentile per-packet one-way delay: 1478.052 ms  
Loss rate: 8.33%  
-- Flow 3:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 1939.723 ms  
Loss rate: 8.33%



Run 1: Report of Verus — Data Link



Run 2: Statistics of Verus

Start at: 2017-09-22 14:07:31

End at: 2017-09-22 14:08:01

Local clock offset: 0.012 ms

Remote clock offset: -0.32 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.03 Mbit/s

95th percentile per-packet one-way delay: 1082.564 ms

Loss rate: 4.82%

-- Flow 1:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1082.564 ms

Loss rate: 2.38%

-- Flow 2:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 1157.676 ms

Loss rate: 8.00%

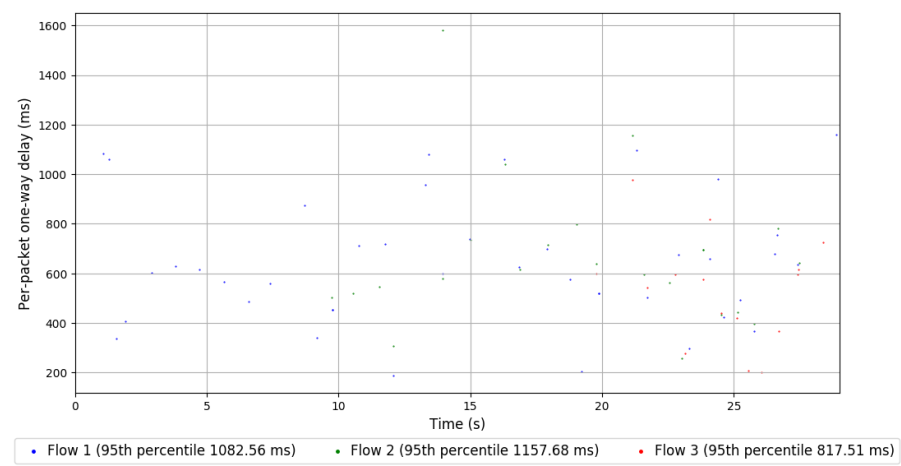
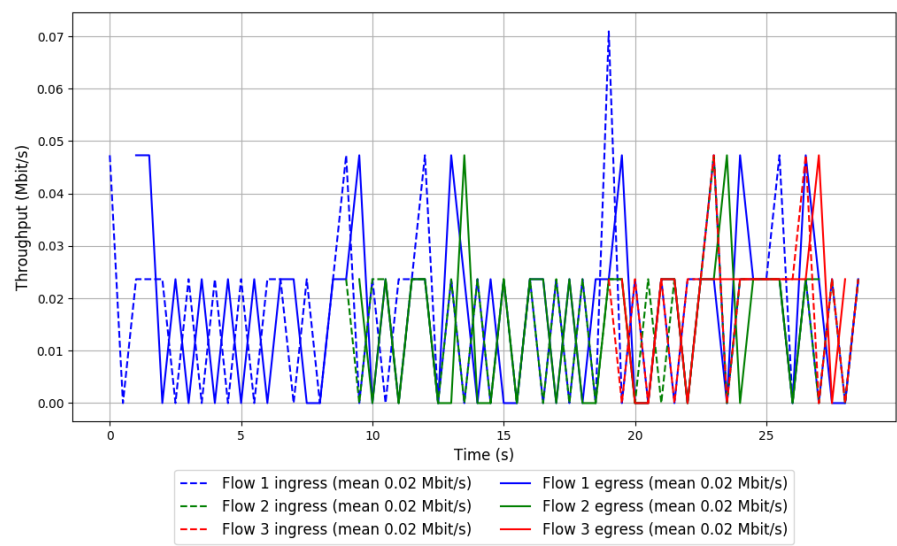
-- Flow 3:

Average throughput: 0.02 Mbit/s

95th percentile per-packet one-way delay: 817.512 ms

Loss rate: 6.25%

Run 2: Report of Verus — Data Link

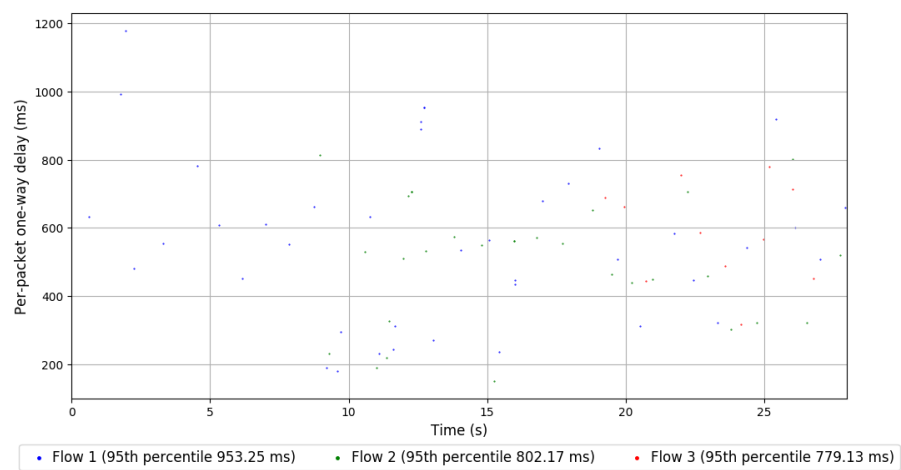
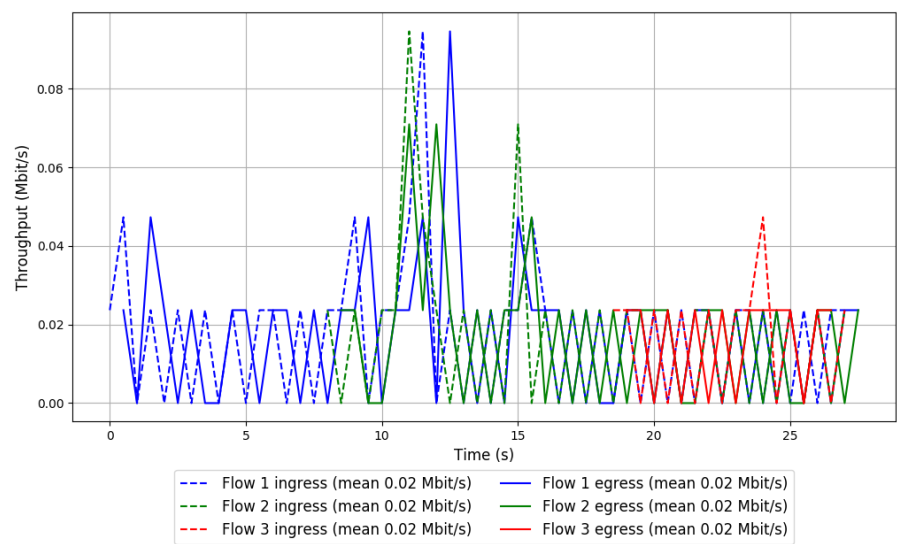


Run 3: Statistics of Verus

Start at: 2017-09-22 14:27:38  
End at: 2017-09-22 14:28:08  
Local clock offset: 0.043 ms  
Remote clock offset: -0.194 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.04 Mbit/s  
95th percentile per-packet one-way delay: 919.161 ms  
Loss rate: 1.22%  
-- Flow 1:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 953.254 ms  
Loss rate: 0.00%  
-- Flow 2:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 802.173 ms  
Loss rate: 0.00%  
-- Flow 3:  
Average throughput: 0.02 Mbit/s  
95th percentile per-packet one-way delay: 779.132 ms  
Loss rate: 8.33%

Run 3: Report of Verus — Data Link



Run 1: Statistics of Indigo

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/1

Run 1: Report of Indigo — Data Link

Figure is missing

Figure is missing

Run 2: Statistics of Indigo

Start at: 2017-09-22 14:04:52

End at: 2017-09-22 14:05:22

Local clock offset: 0.093 ms

Remote clock offset: 0.006 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.09 Mbit/s

95th percentile per-packet one-way delay: 12739.318 ms

Loss rate: 33.84%

-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 12810.244 ms

Loss rate: 18.19%

-- Flow 2:

Average throughput: 0.07 Mbit/s

95th percentile per-packet one-way delay: 8055.055 ms

Loss rate: 34.02%

-- Flow 3:

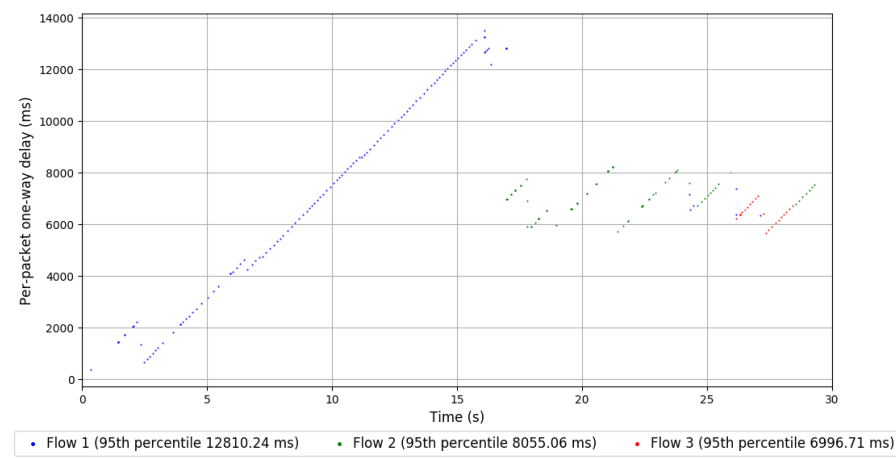
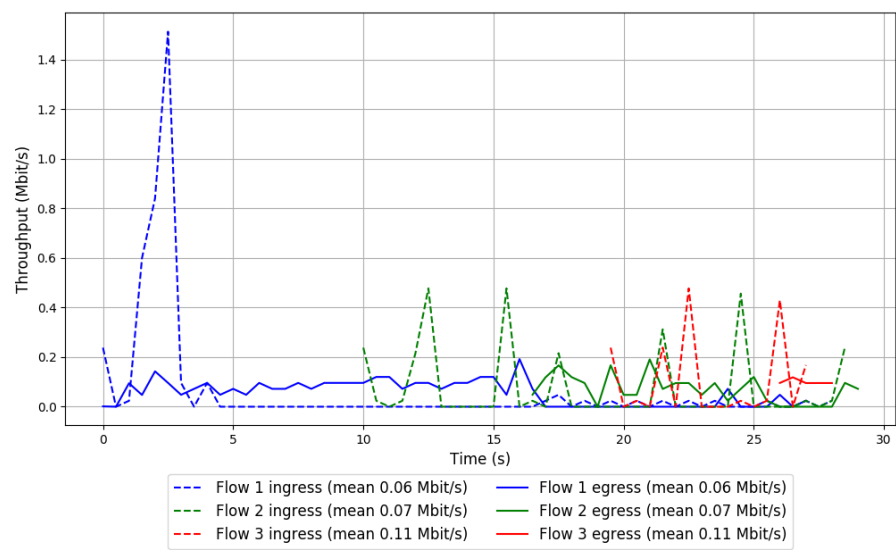
Average throughput: 0.11 Mbit/s

95th percentile per-packet one-way delay: 6996.714 ms

Loss rate: 69.16%



Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/1

Run 3: Report of Indigo — Data Link

Figure is missing

Figure is missing

Run 1: Statistics of Indigo-cellular

Start at: 2017-09-22 13:42:42

End at: 2017-09-22 13:43:12

Local clock offset: 0.068 ms

Remote clock offset: -2.88 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.10 Mbit/s

95th percentile per-packet one-way delay: 17119.377 ms

Loss rate: 78.76%

-- Flow 1:

Average throughput: 0.08 Mbit/s

95th percentile per-packet one-way delay: 15970.701 ms

Loss rate: 61.81%

-- Flow 2:

Average throughput: 0.05 Mbit/s

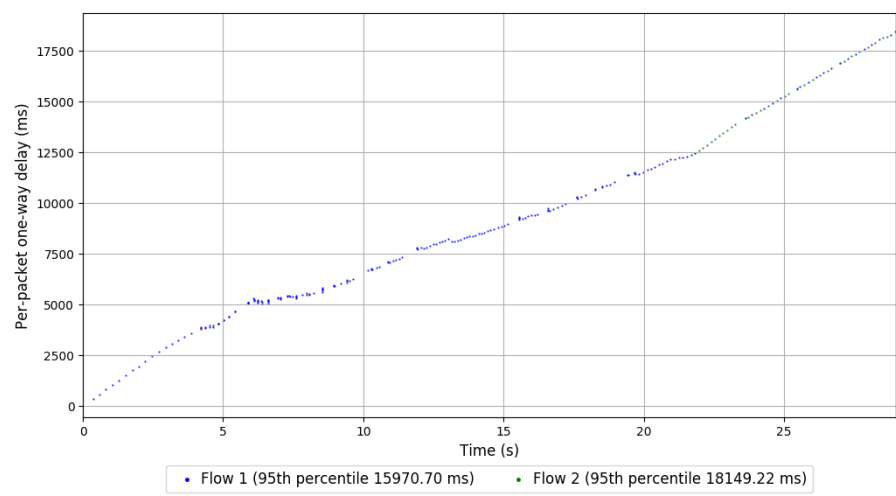
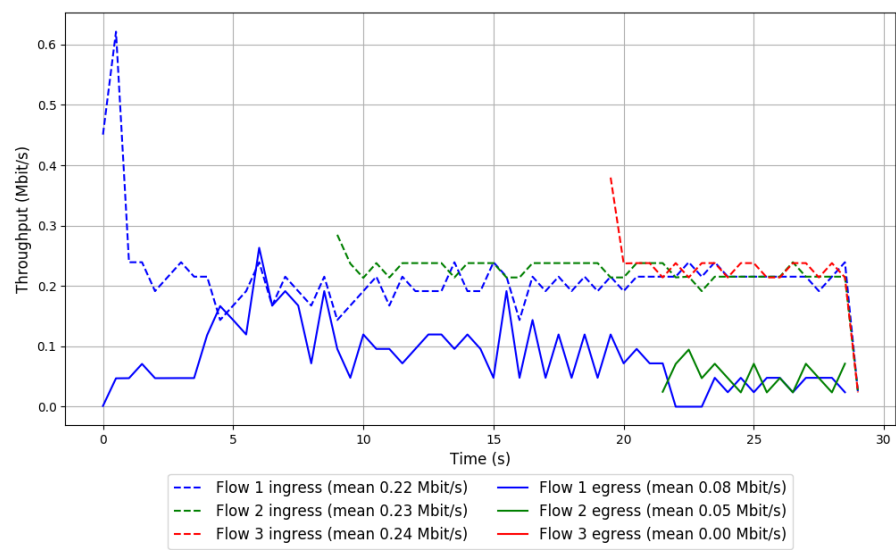
95th percentile per-packet one-way delay: 18149.224 ms

Loss rate: 91.66%

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 1: Report of Indigo-cellular — Data Link



Run 2: Statistics of Indigo-cellular

/home/ubuntu/pantheon\_data/2017-09-22T13-28-Mexico-ppp0-to-AWS-California-2-3-runs-3-flows/1

Run 2: Report of Indigo-cellular — Data Link

Figure is missing

Figure is missing

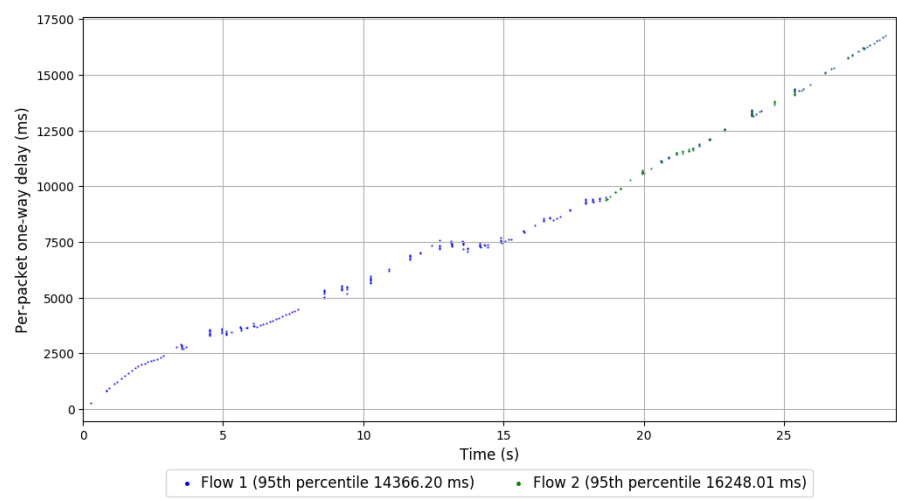
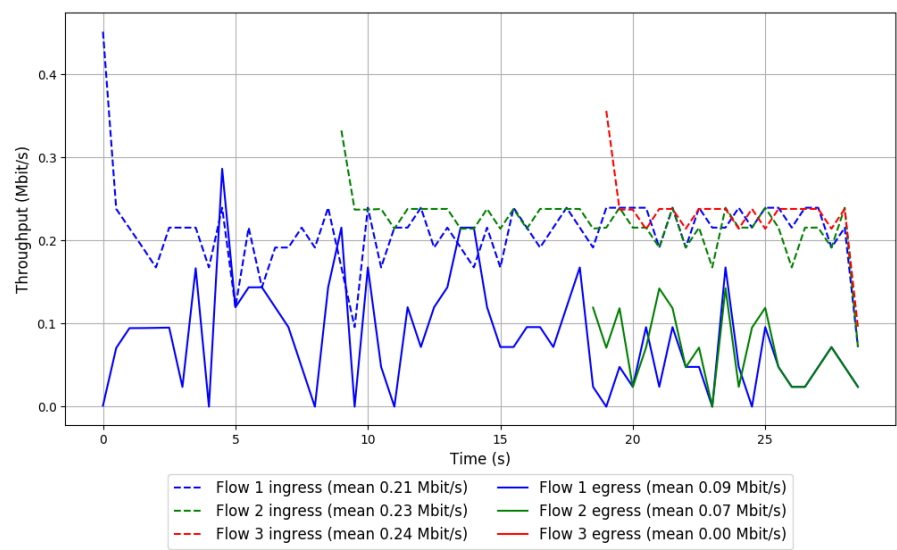
Run 3: Statistics of Indigo-cellular

Start at: 2017-09-22 14:23:17  
End at: 2017-09-22 14:23:47  
Local clock offset: 0.131 ms  
Remote clock offset: -2.203 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.11 Mbit/s  
95th percentile per-packet one-way delay: 15879.155 ms  
Loss rate: 75.30%  
-- Flow 1:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 14366.205 ms  
Loss rate: 59.95%  
-- Flow 2:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 16248.014 ms  
Loss rate: 83.58%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s



Run 3: Report of Indigo-cellular — Data Link

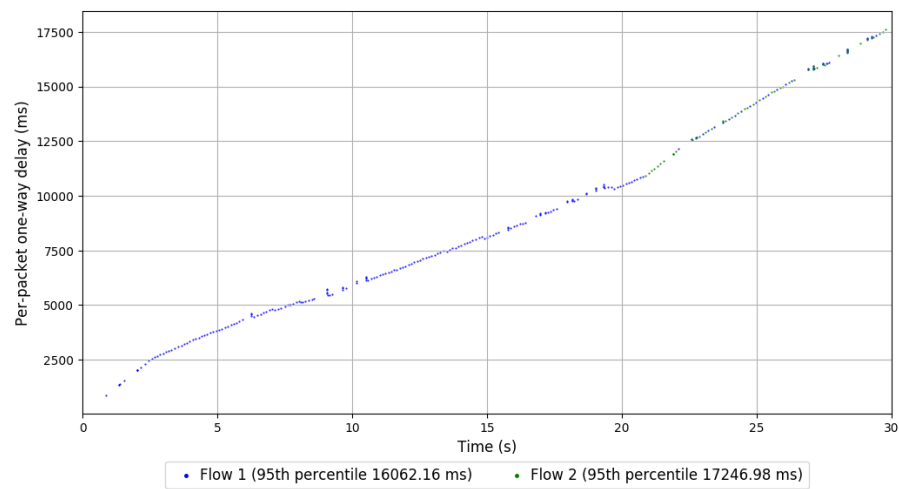
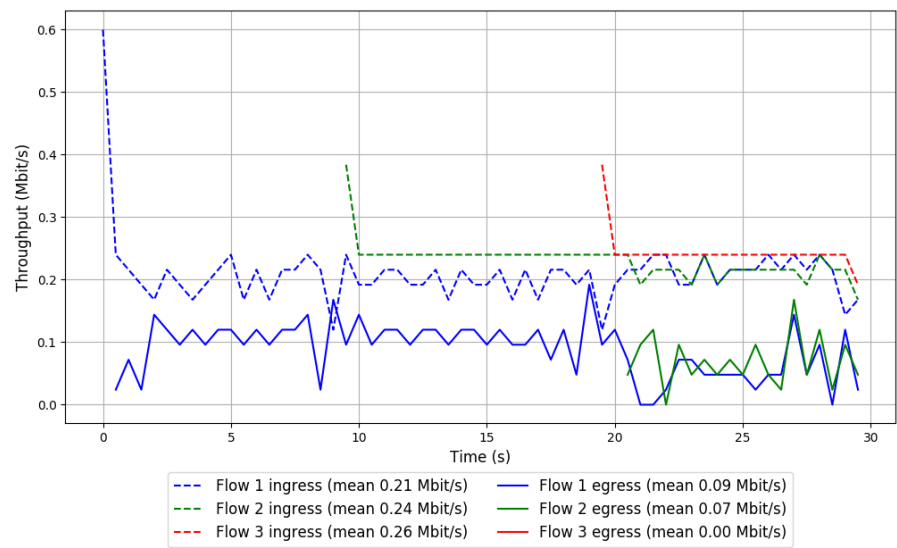


```
Run 1: Statistics of KohoCC

Start at: 2017-09-22 13:31:52
End at: 2017-09-22 13:32:22
Local clock offset: 0.104 ms
Remote clock offset: -0.758 ms

# Below is generated by plot.py at 2017-09-22 15:29:44
# Datalink statistics
-- Total of 3 flows:
Average throughput: 0.11 Mbit/s
95th percentile per-packet one-way delay: 16703.443 ms
Loss rate: 75.90%
-- Flow 1:
Average throughput: 0.09 Mbit/s
95th percentile per-packet one-way delay: 16062.162 ms
Loss rate: 58.48%
-- Flow 2:
Average throughput: 0.07 Mbit/s
95th percentile per-packet one-way delay: 17246.980 ms
Loss rate: 86.04%
-- Flow 3:
Average throughput: 0.00 Mbit/s
```

Run 1: Report of KohoCC — Data Link

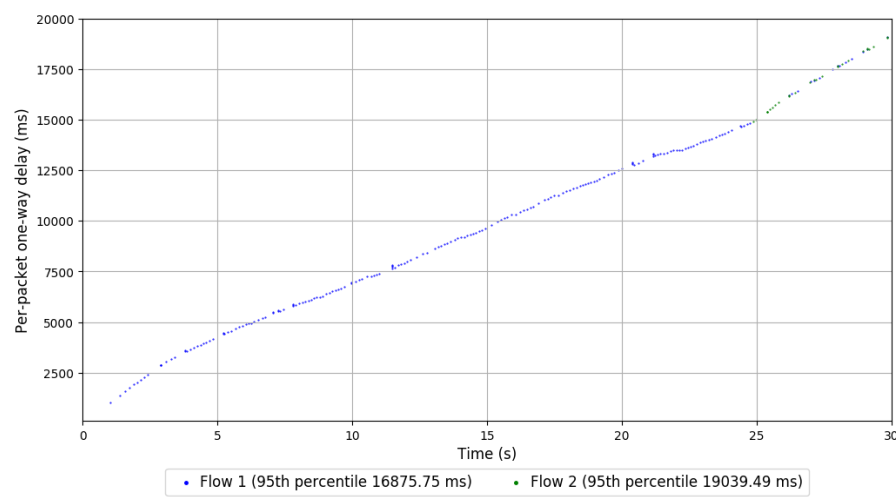
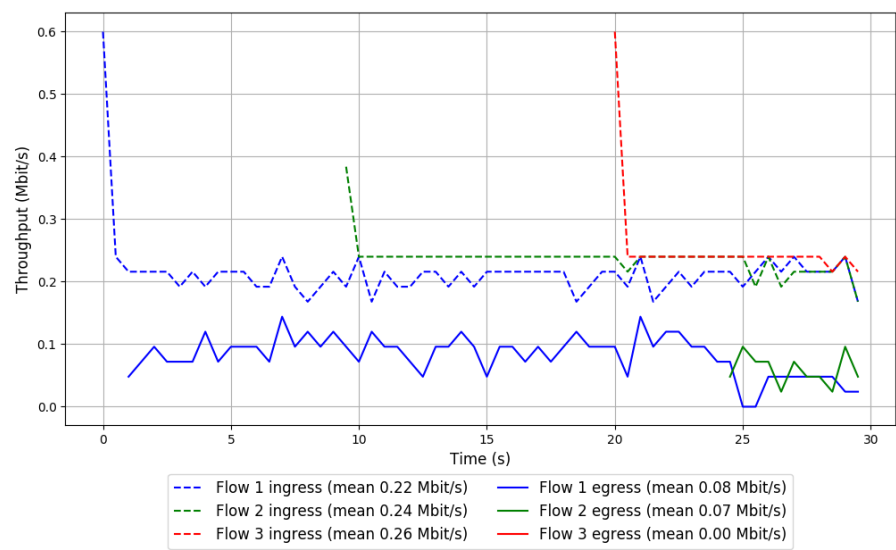


Run 2: Statistics of KohoCC

Start at: 2017-09-22 13:52:36  
End at: 2017-09-22 13:53:06  
Local clock offset: 0.01 ms  
Remote clock offset: -2.637 ms

# Below is generated by plot.py at 2017-09-22 15:29:44  
# Datalink statistics  
-- Total of 3 flows:  
Average throughput: 0.09 Mbit/s  
95th percentile per-packet one-way delay: 17924.949 ms  
Loss rate: 80.50%  
-- Flow 1:  
Average throughput: 0.08 Mbit/s  
95th percentile per-packet one-way delay: 16875.752 ms  
Loss rate: 63.13%  
-- Flow 2:  
Average throughput: 0.07 Mbit/s  
95th percentile per-packet one-way delay: 19039.493 ms  
Loss rate: 93.32%  
-- Flow 3:  
Average throughput: 0.00 Mbit/s

Run 2: Report of KohoCC — Data Link



Run 3: Statistics of KohoCC

Start at: 2017-09-22 14:12:51

End at: 2017-09-22 14:13:21

Local clock offset: 0.026 ms

Remote clock offset: 0.145 ms

# Below is generated by plot.py at 2017-09-22 15:29:44

# Datalink statistics

-- Total of 3 flows:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 23520.022 ms

Loss rate: 88.55%

-- Flow 1:

Average throughput: 0.06 Mbit/s

95th percentile per-packet one-way delay: 23520.022 ms

Loss rate: 75.63%

-- Flow 2:

Average throughput: 0.00 Mbit/s

-- Flow 3:

Average throughput: 0.00 Mbit/s

Run 3: Report of KohoCC — Data Link

