

Pantheon Report

Generated at 2018-08-28 12:16:52 (UTC).

Data path: GCE Tokyo on `ens4` (*remote*) → GCE Sydney on `ens4` (*local*).

Repeated the test of 4 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

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

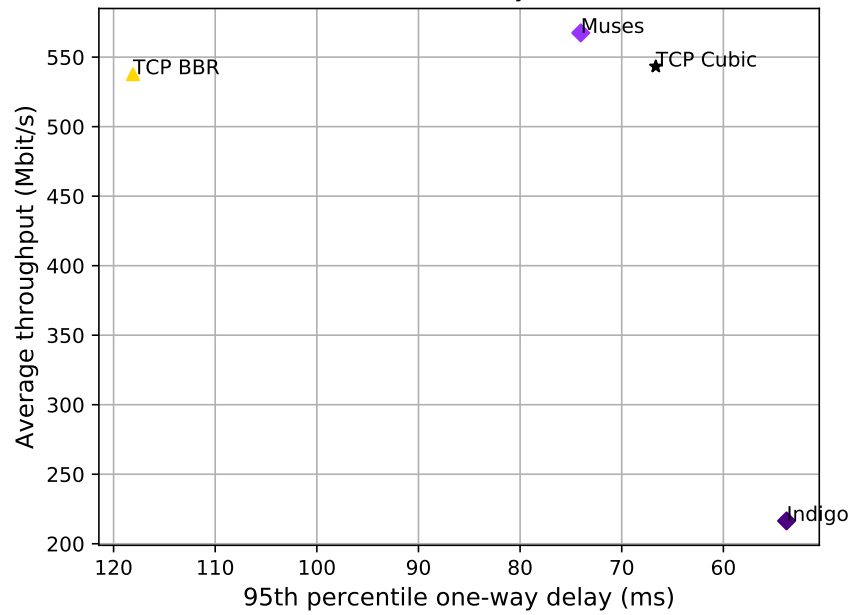
System info:

```
Linux 4.15.0-1015-gcp
net.core.default_qdisc = fq
net.core.rmem_default = 16777216
net.core.rmem_max = 536870912
net.core.wmem_default = 16777216
net.core.wmem_max = 536870912
net.ipv4.tcp_rmem = 4096 16777216 536870912
net.ipv4.tcp_wmem = 4096 16777216 536870912
```

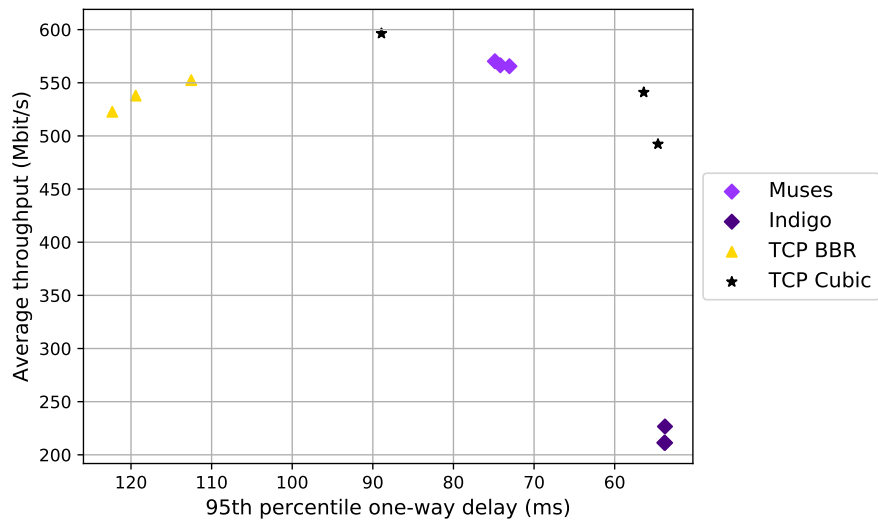
Git summary:

```
branch: muses @ 86ef433b09b2f4ecae1186d6940af93bcf0969cd
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b261c9e99c63be452bc16f94ce0caa99a4c9d39a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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 GCE Tokyo to GCE Sydney, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE Tokyo to GCE Sydney, 3 runs of 30s each per scheme



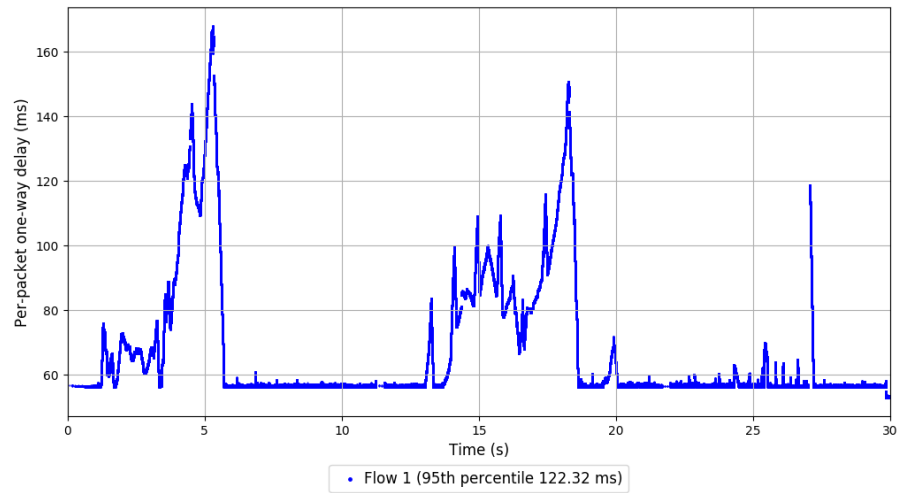
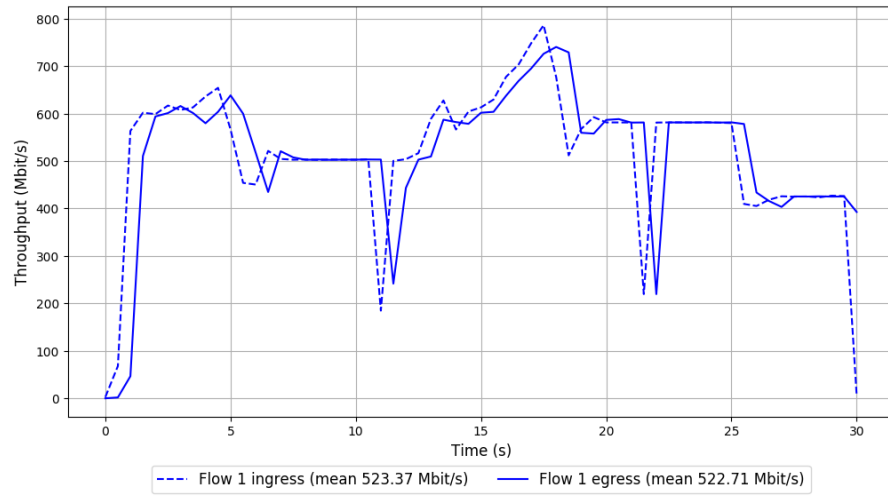
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	537.71	118.09	0.62
TCP Cubic	3	543.25	66.65	0.46
Indigo	3	216.43	53.78	0.38
Muses	3	567.42	74.03	0.48

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 11:47:36
End at: 2018-08-28 11:48:06
Local clock offset: -0.146 ms
Remote clock offset: -2.823 ms

Below is generated by plot.py at 2018-08-28 12:11:46
Datalink statistics
-- Total of 1 flow:
Average throughput: 522.71 Mbit/s
95th percentile per-packet one-way delay: 122.321 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 522.71 Mbit/s
95th percentile per-packet one-way delay: 122.321 ms
Loss rate: 0.47%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-28 11:53:38

End at: 2018-08-28 11:54:08

Local clock offset: 0.005 ms

Remote clock offset: 2.845 ms

Below is generated by plot.py at 2018-08-28 12:12:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 537.93 Mbit/s

95th percentile per-packet one-way delay: 119.421 ms

Loss rate: 0.99%

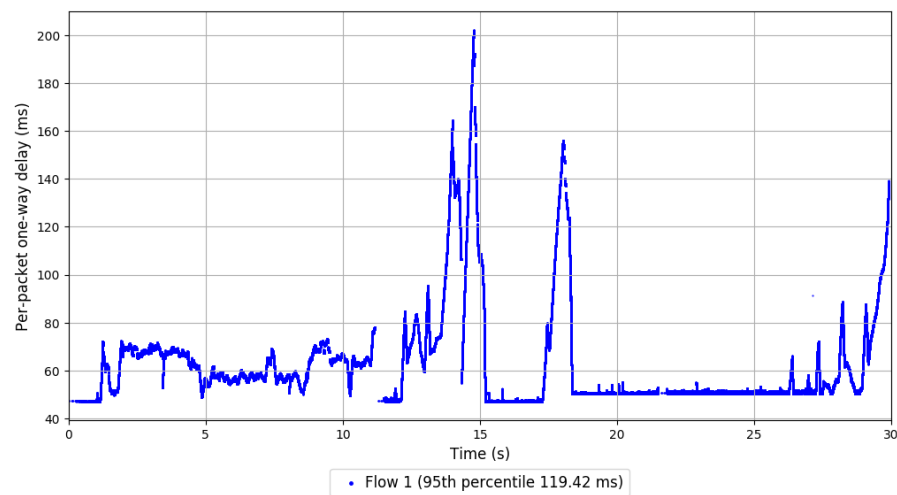
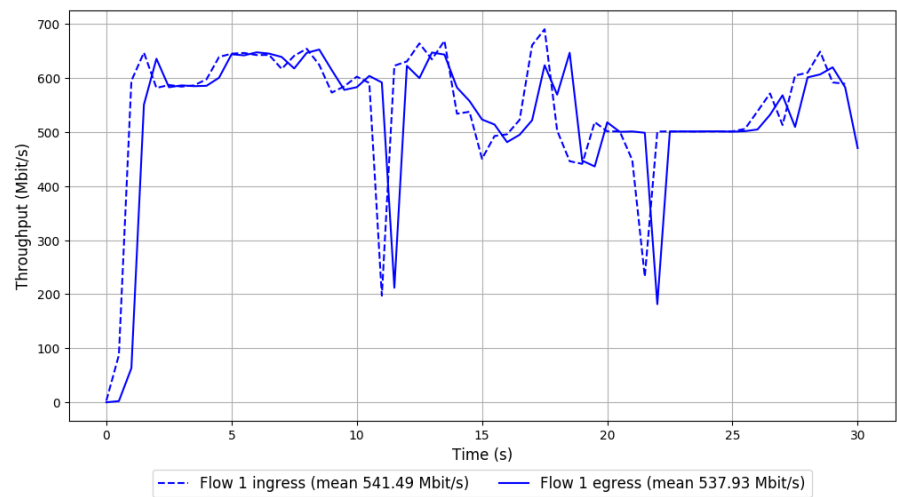
-- Flow 1:

Average throughput: 537.93 Mbit/s

95th percentile per-packet one-way delay: 119.421 ms

Loss rate: 0.99%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 11:59:38

End at: 2018-08-28 12:00:08

Local clock offset: 0.053 ms

Remote clock offset: 2.793 ms

Below is generated by plot.py at 2018-08-28 12:12:10

Datalink statistics

-- Total of 1 flow:

Average throughput: 552.50 Mbit/s

95th percentile per-packet one-way delay: 112.526 ms

Loss rate: 0.40%

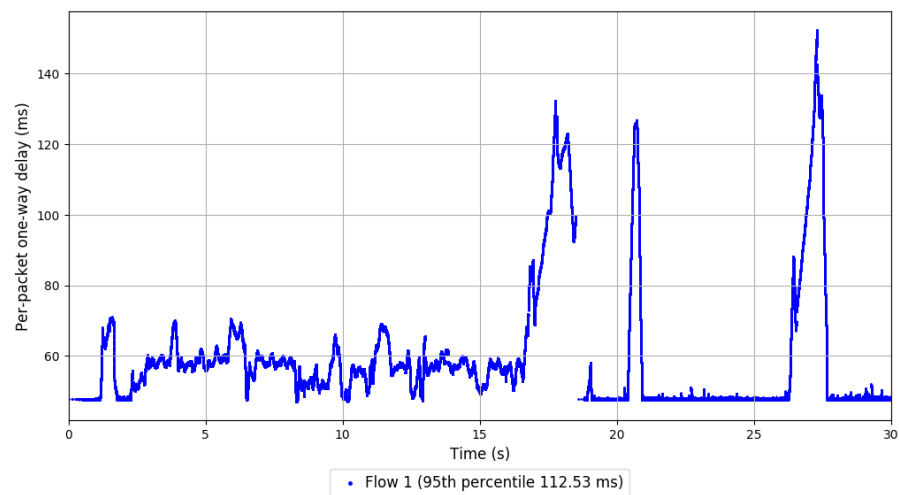
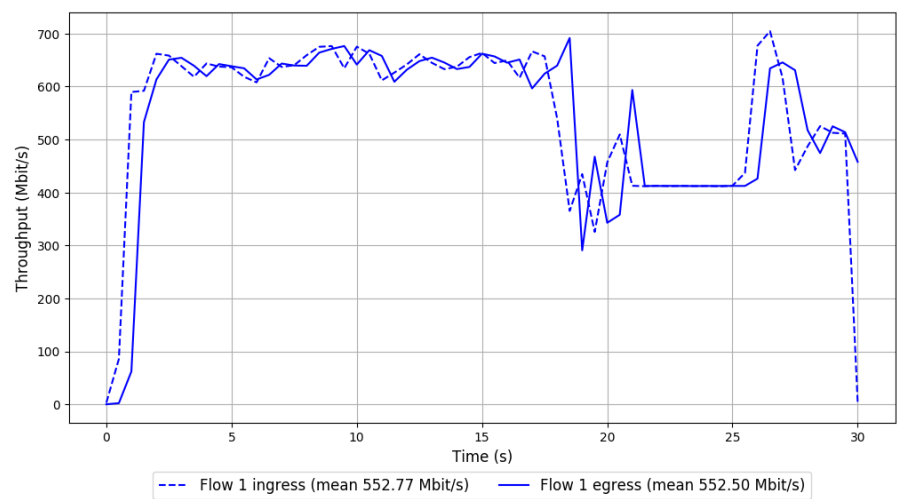
-- Flow 1:

Average throughput: 552.50 Mbit/s

95th percentile per-packet one-way delay: 112.526 ms

Loss rate: 0.40%

Run 3: Report of TCP BBR — Data Link

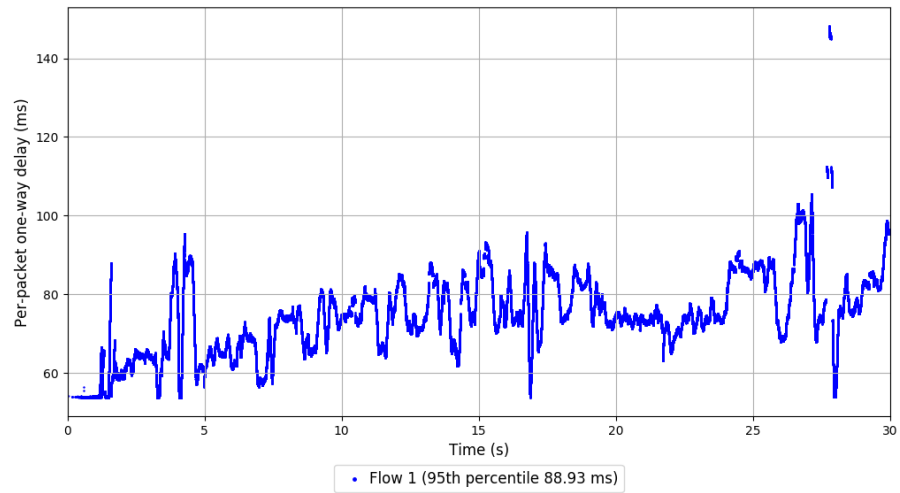
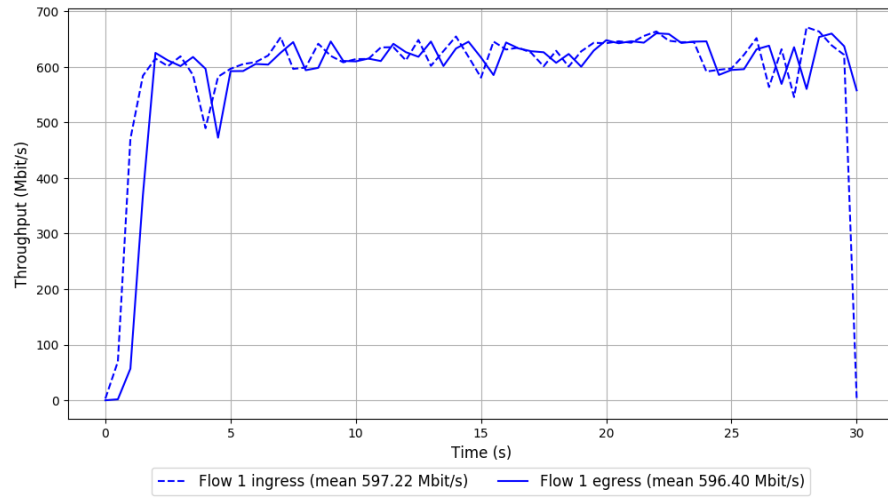


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 11:44:28
End at: 2018-08-28 11:44:58
Local clock offset: 0.118 ms
Remote clock offset: -0.034 ms

Below is generated by plot.py at 2018-08-28 12:12:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 596.40 Mbit/s
95th percentile per-packet one-way delay: 88.930 ms
Loss rate: 0.49%
-- Flow 1:
Average throughput: 596.40 Mbit/s
95th percentile per-packet one-way delay: 88.930 ms
Loss rate: 0.49%

Run 1: Report of TCP Cubic — Data Link

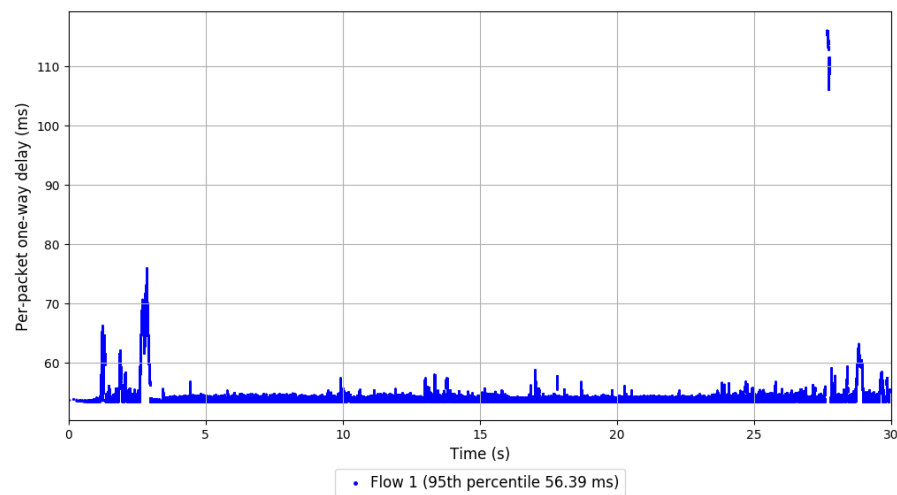
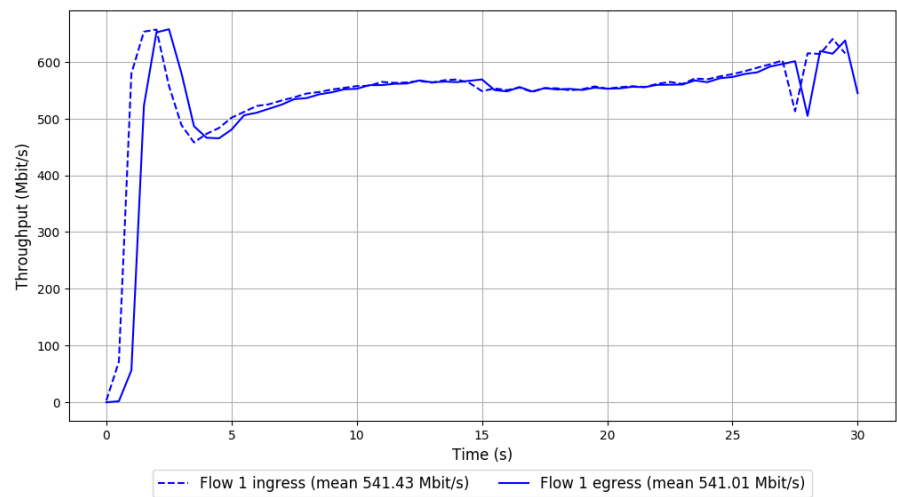


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 11:50:33
End at: 2018-08-28 11:51:03
Local clock offset: 0.065 ms
Remote clock offset: -0.014 ms

Below is generated by plot.py at 2018-08-28 12:12:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 541.01 Mbit/s
95th percentile per-packet one-way delay: 56.392 ms
Loss rate: 0.43%
-- Flow 1:
Average throughput: 541.01 Mbit/s
95th percentile per-packet one-way delay: 56.392 ms
Loss rate: 0.43%

Run 2: Report of TCP Cubic — Data Link

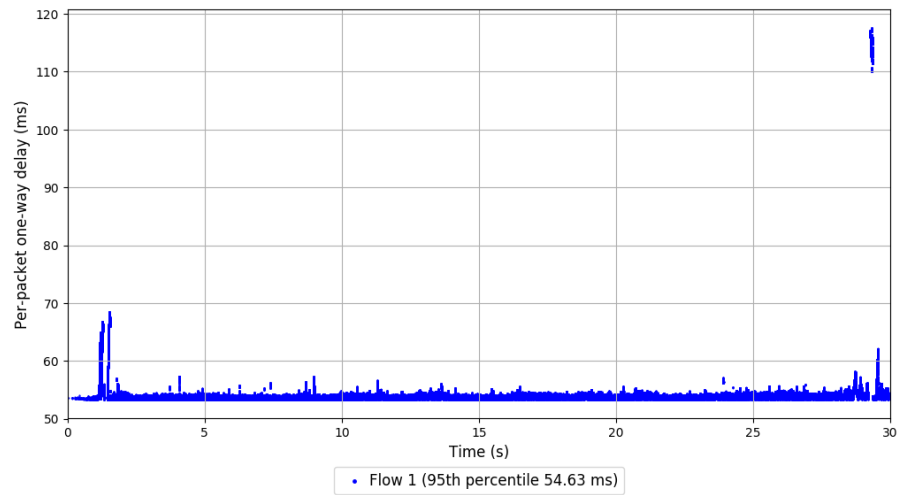
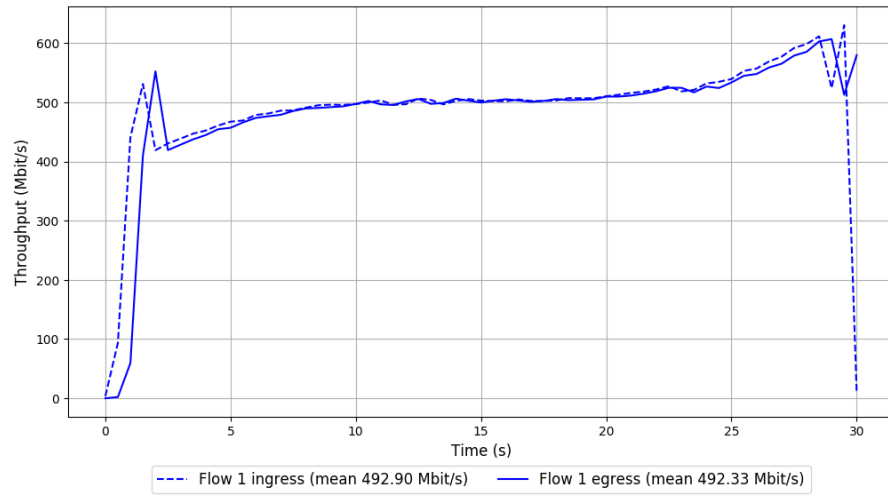


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 11:56:35
End at: 2018-08-28 11:57:05
Local clock offset: -0.188 ms
Remote clock offset: -0.073 ms

Below is generated by plot.py at 2018-08-28 12:12:26
Datalink statistics
-- Total of 1 flow:
Average throughput: 492.33 Mbit/s
95th percentile per-packet one-way delay: 54.628 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 492.33 Mbit/s
95th percentile per-packet one-way delay: 54.628 ms
Loss rate: 0.47%

Run 3: Report of TCP Cubic — Data Link

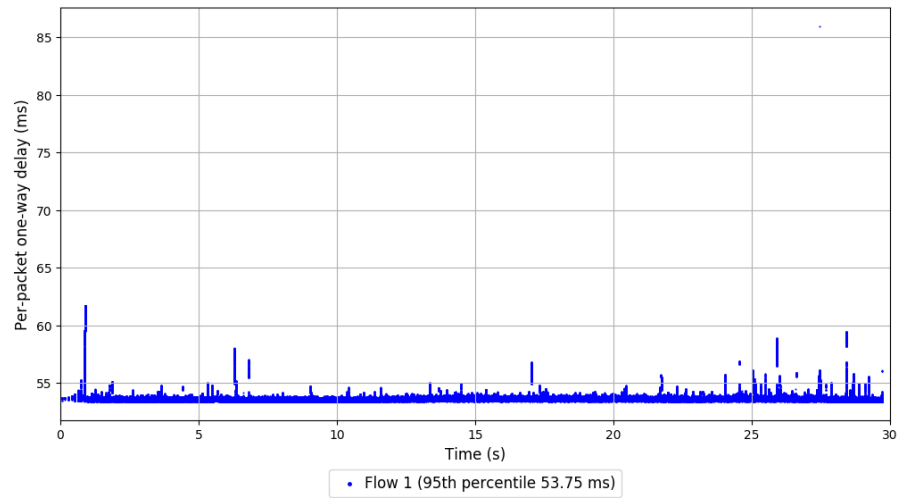
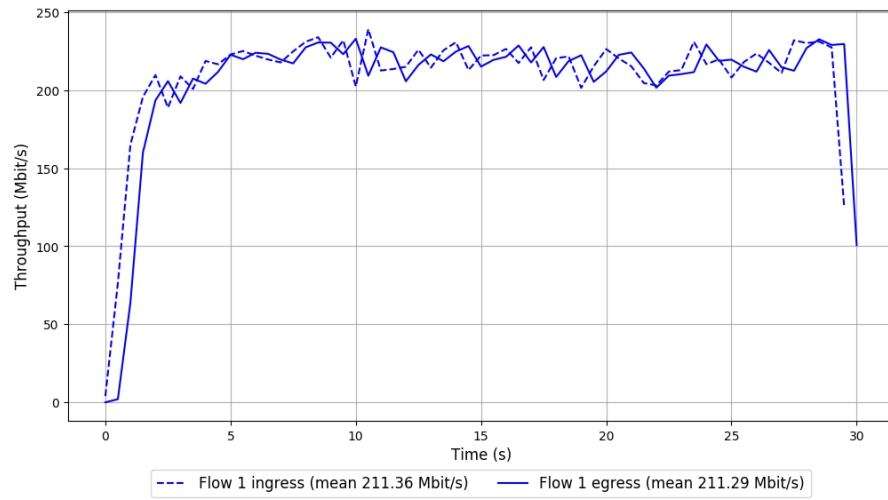


```
Run 1: Statistics of Indigo

Start at: 2018-08-28 11:43:03
End at: 2018-08-28 11:43:33
Local clock offset: -0.02 ms
Remote clock offset: 0.048 ms

# Below is generated by plot.py at 2018-08-28 12:12:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 211.29 Mbit/s
95th percentile per-packet one-way delay: 53.751 ms
Loss rate: 0.39%
-- Flow 1:
Average throughput: 211.29 Mbit/s
95th percentile per-packet one-way delay: 53.751 ms
Loss rate: 0.39%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-28 11:49:08

End at: 2018-08-28 11:49:38

Local clock offset: -0.047 ms

Remote clock offset: 0.064 ms

Below is generated by plot.py at 2018-08-28 12:12:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 226.64 Mbit/s

95th percentile per-packet one-way delay: 53.762 ms

Loss rate: 0.33%

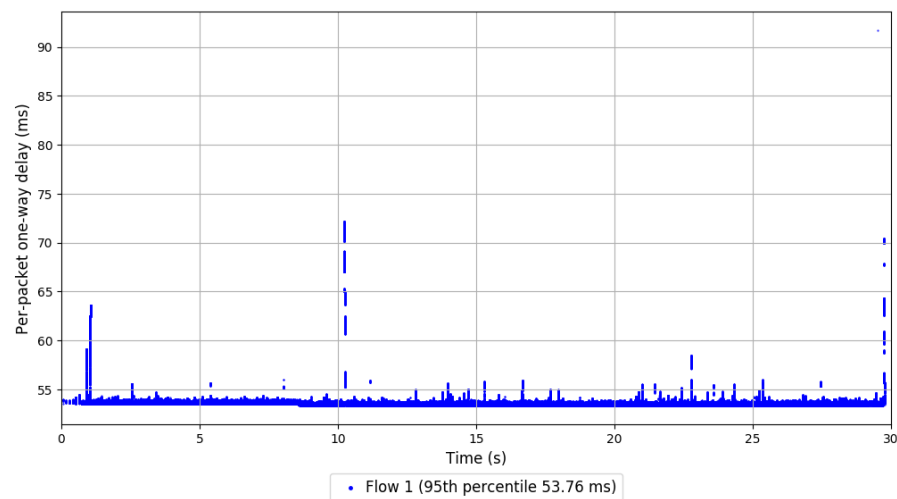
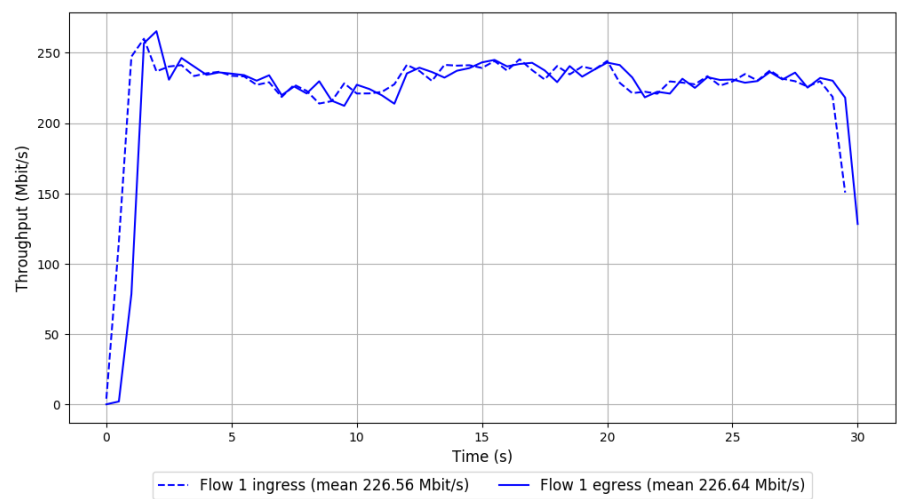
-- Flow 1:

Average throughput: 226.64 Mbit/s

95th percentile per-packet one-way delay: 53.762 ms

Loss rate: 0.33%

Run 2: Report of Indigo — Data Link

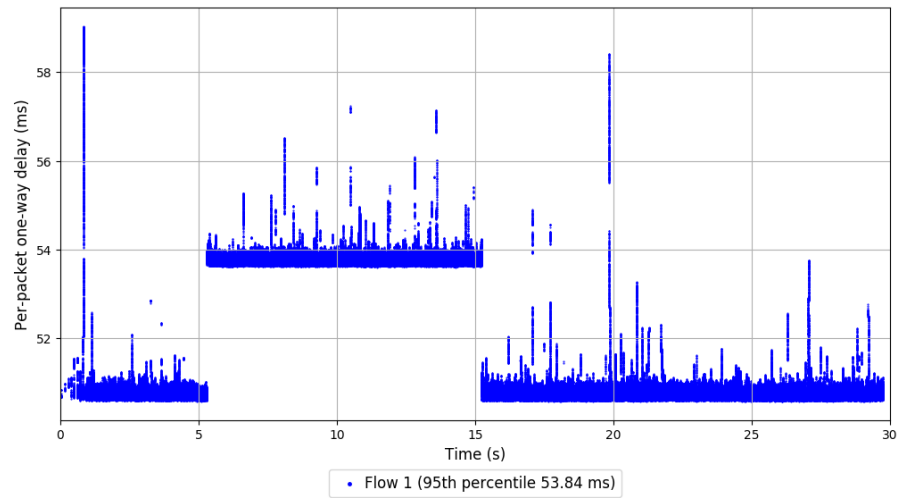
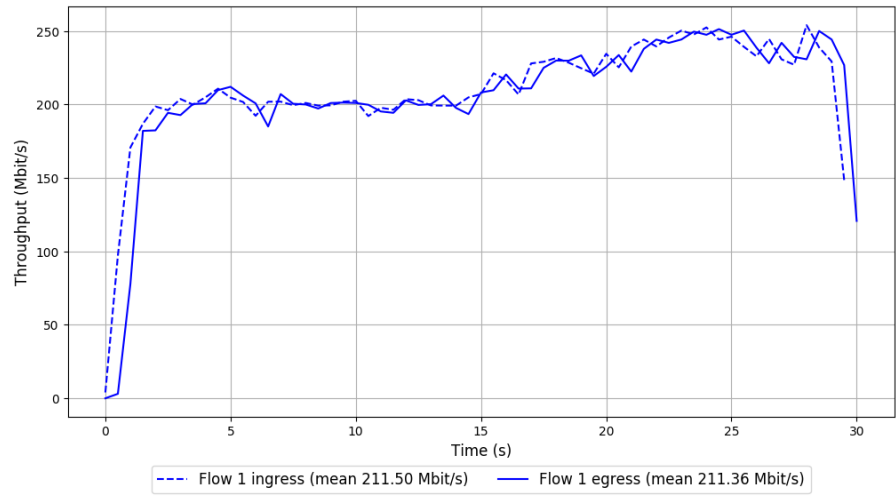


Run 3: Statistics of Indigo

Start at: 2018-08-28 11:55:11
End at: 2018-08-28 11:55:41
Local clock offset: 0.147 ms
Remote clock offset: -0.065 ms

Below is generated by plot.py at 2018-08-28 12:13:51
Datalink statistics
-- Total of 1 flow:
Average throughput: 211.36 Mbit/s
95th percentile per-packet one-way delay: 53.838 ms
Loss rate: 0.41%
-- Flow 1:
Average throughput: 211.36 Mbit/s
95th percentile per-packet one-way delay: 53.838 ms
Loss rate: 0.41%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses

Start at: 2018-08-28 11:46:02

End at: 2018-08-28 11:46:32

Local clock offset: -0.075 ms

Remote clock offset: 2.817 ms

Below is generated by plot.py at 2018-08-28 12:16:39

Datalink statistics

-- Total of 1 flow:

Average throughput: 570.23 Mbit/s

95th percentile per-packet one-way delay: 74.855 ms

Loss rate: 0.45%

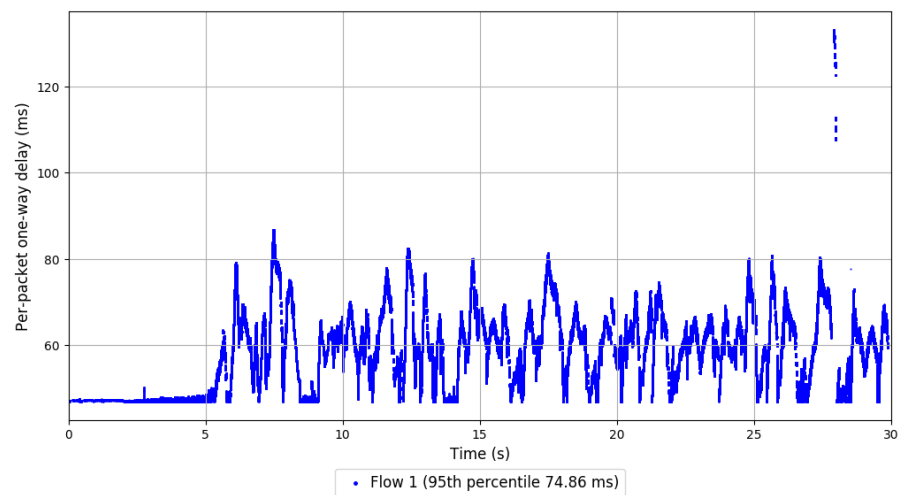
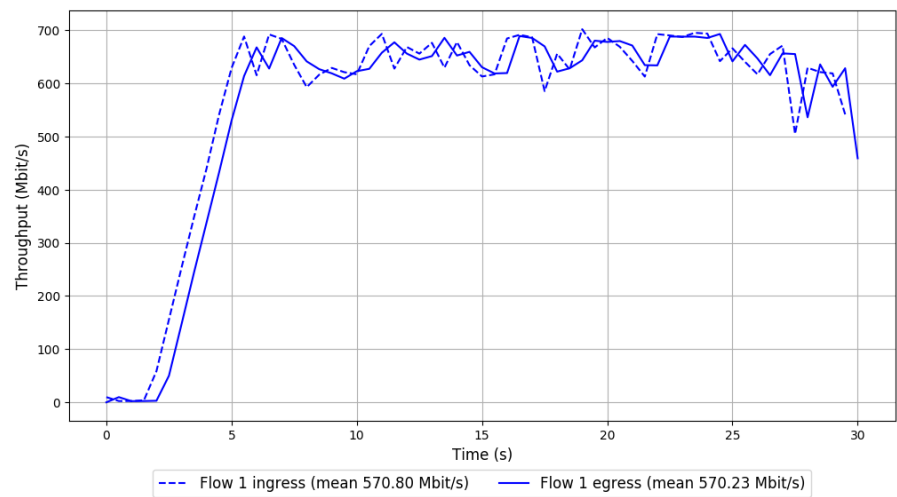
-- Flow 1:

Average throughput: 570.23 Mbit/s

95th percentile per-packet one-way delay: 74.855 ms

Loss rate: 0.45%

Run 1: Report of Muses — Data Link

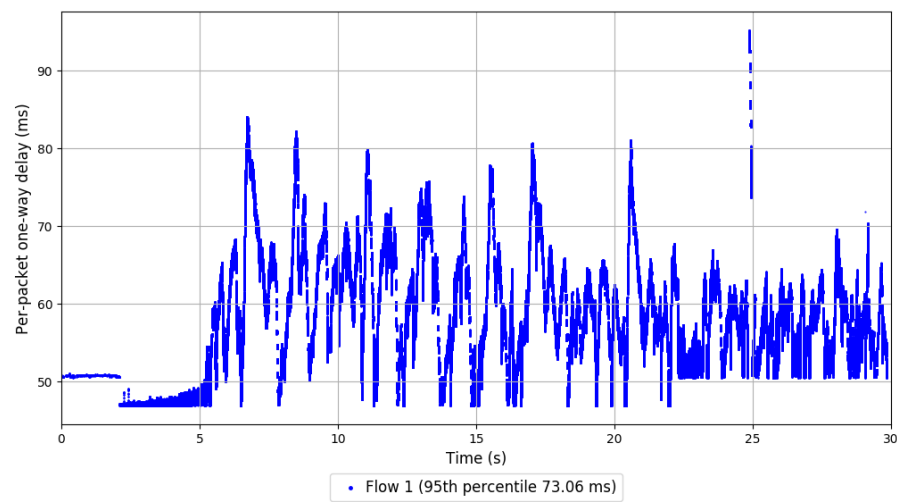
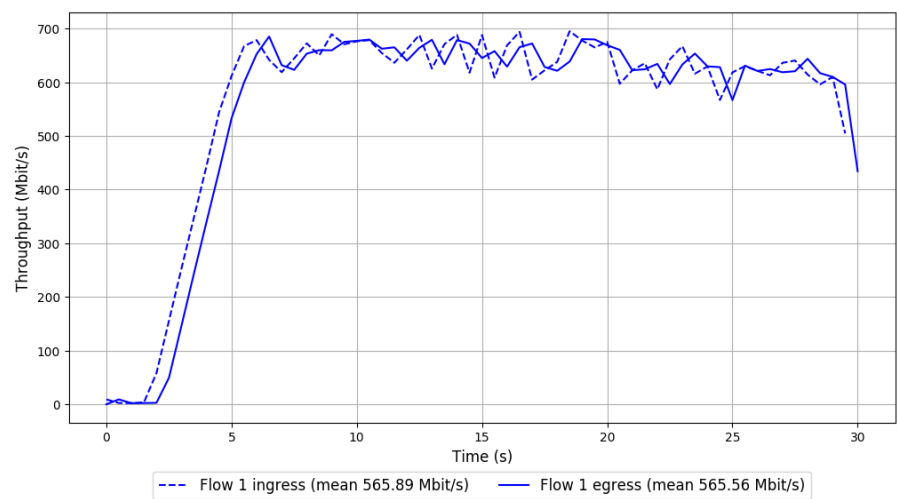


Run 2: Statistics of Muses

Start at: 2018-08-28 11:52:04
End at: 2018-08-28 11:52:34
Local clock offset: -0.087 ms
Remote clock offset: 2.814 ms

Below is generated by plot.py at 2018-08-28 12:16:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 565.56 Mbit/s
95th percentile per-packet one-way delay: 73.057 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 565.56 Mbit/s
95th percentile per-packet one-way delay: 73.057 ms
Loss rate: 0.42%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 11:58:04
End at: 2018-08-28 11:58:34
Local clock offset: 0.01 ms
Remote clock offset: -0.064 ms

Below is generated by plot.py at 2018-08-28 12:16:50
Datalink statistics
-- Total of 1 flow:
Average throughput: 566.46 Mbit/s
95th percentile per-packet one-way delay: 74.181 ms
Loss rate: 0.56%
-- Flow 1:
Average throughput: 566.46 Mbit/s
95th percentile per-packet one-way delay: 74.181 ms
Loss rate: 0.56%

Run 3: Report of Muses — Data Link

