

Pantheon Report

Generated at 2018-08-28 10:50:51 (UTC).

Data path: GCE London on *ens4 (local)* → GCE Iowa on *ens4 (remote)*.

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.

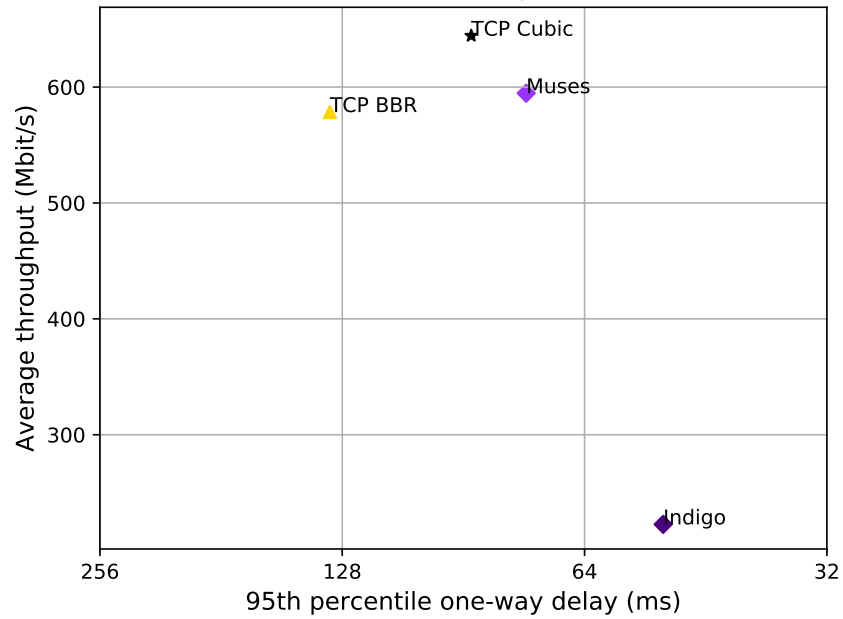
System info:

```
Linux 4.15.0-1017-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
```

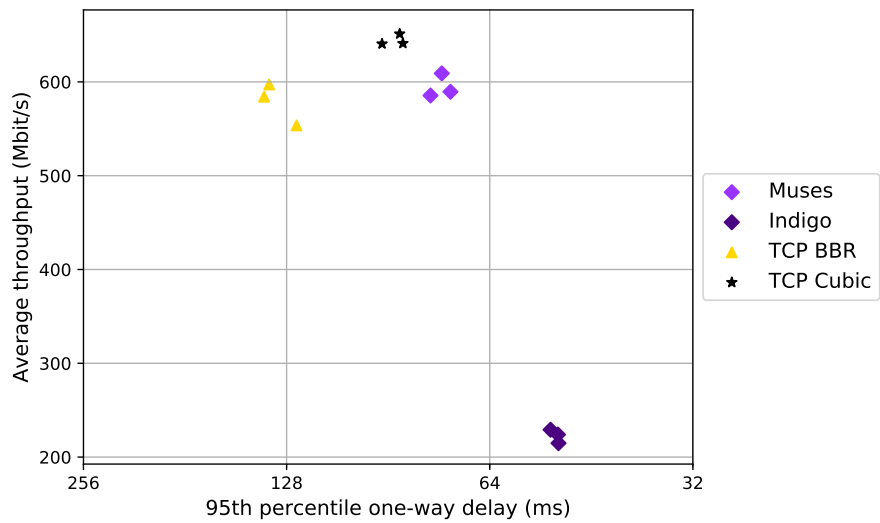
Git summary:

```
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 @ cbfce6db5ff5740dafa1771f813cd646339e1952
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 London to GCE Iowa, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE London to GCE Iowa, 3 runs of 30s each per scheme



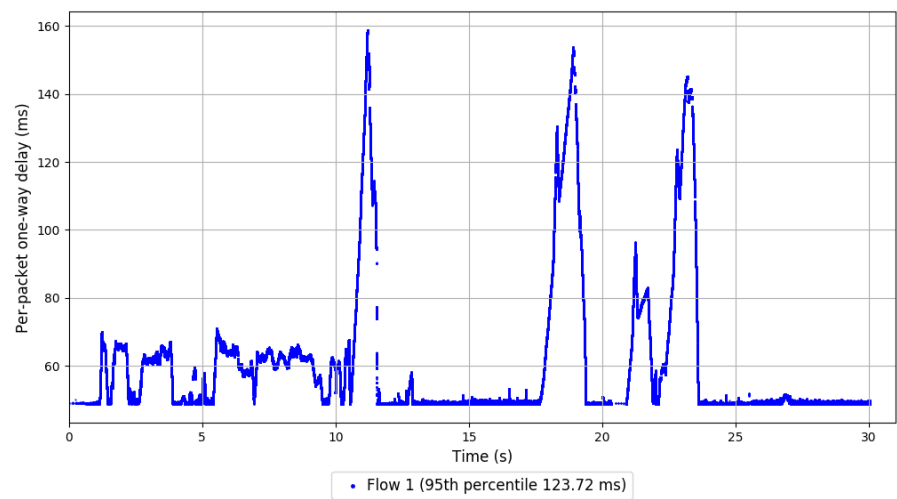
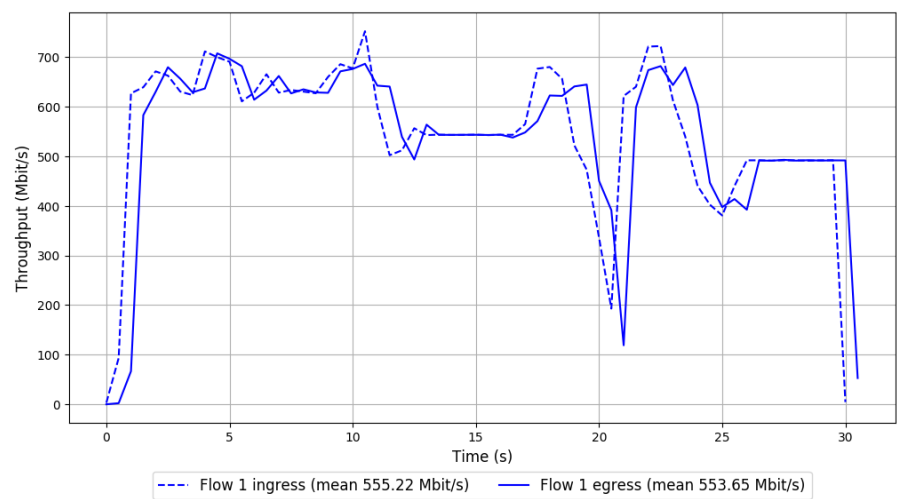
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	578.41	132.60	0.55
TCP Cubic	3	644.28	88.51	0.11
Indigo	3	222.67	51.11	0.00
Muses	3	594.70	75.63	0.06

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 10:19:22
End at: 2018-08-28 10:19:52
Local clock offset: -0.131 ms
Remote clock offset: -0.264 ms

Below is generated by plot.py at 2018-08-28 10:45:40
Datalink statistics
-- Total of 1 flow:
Average throughput: 553.65 Mbit/s
95th percentile per-packet one-way delay: 123.723 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 553.65 Mbit/s
95th percentile per-packet one-way delay: 123.723 ms
Loss rate: 0.28%

Run 1: Report of TCP BBR — Data Link

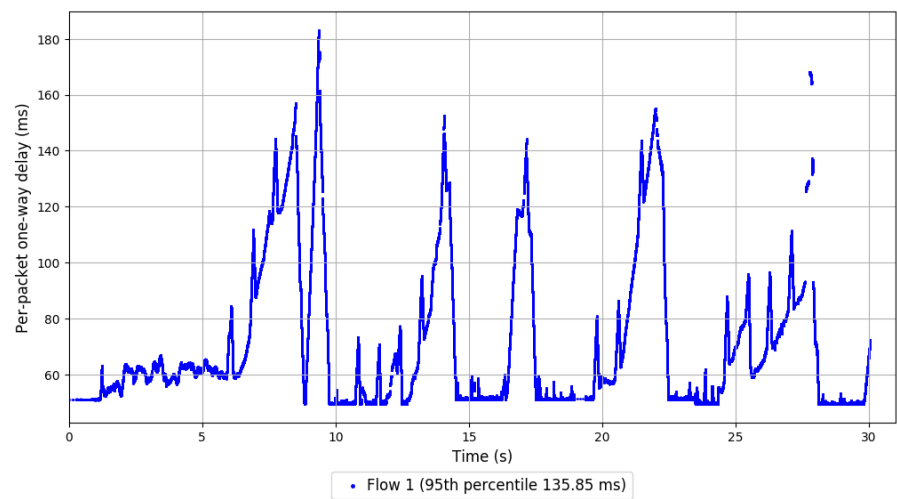
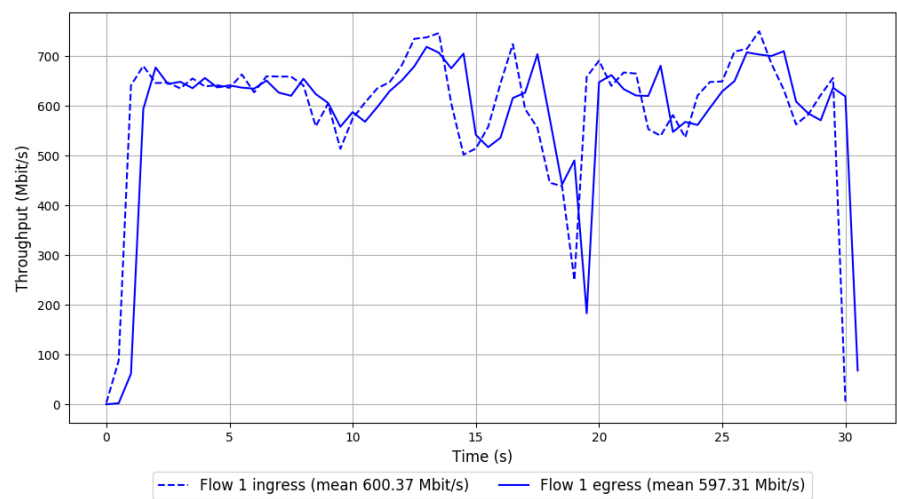


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 10:25:32
End at: 2018-08-28 10:26:03
Local clock offset: -0.725 ms
Remote clock offset: -0.284 ms

Below is generated by plot.py at 2018-08-28 10:46:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 597.31 Mbit/s
95th percentile per-packet one-way delay: 135.846 ms
Loss rate: 0.51%
-- Flow 1:
Average throughput: 597.31 Mbit/s
95th percentile per-packet one-way delay: 135.846 ms
Loss rate: 0.51%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 10:31:43

End at: 2018-08-28 10:32:13

Local clock offset: 0.291 ms

Remote clock offset: -0.344 ms

Below is generated by plot.py at 2018-08-28 10:46:09

Datalink statistics

-- Total of 1 flow:

Average throughput: 584.28 Mbit/s

95th percentile per-packet one-way delay: 138.223 ms

Loss rate: 0.85%

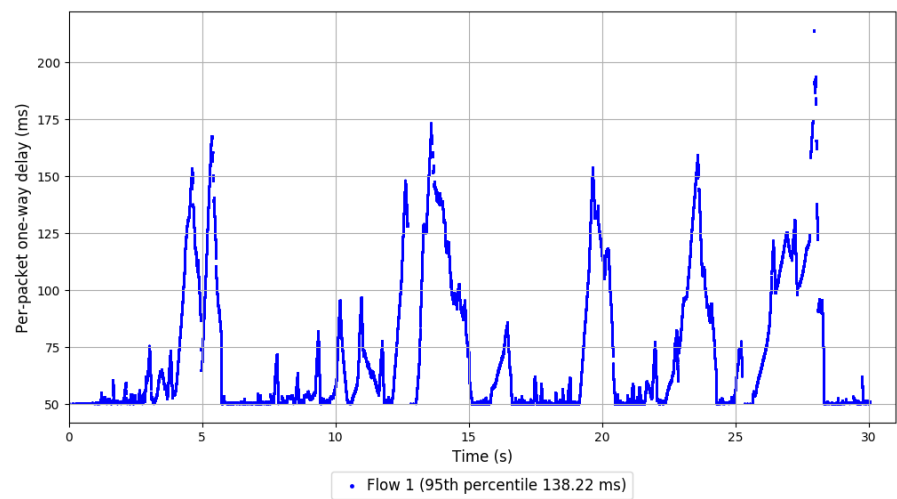
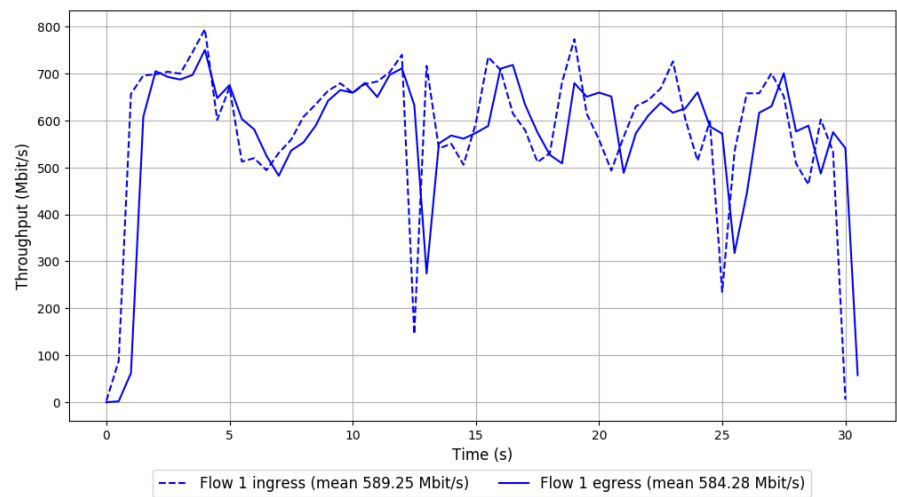
-- Flow 1:

Average throughput: 584.28 Mbit/s

95th percentile per-packet one-way delay: 138.223 ms

Loss rate: 0.85%

Run 3: Report of TCP BBR — Data Link

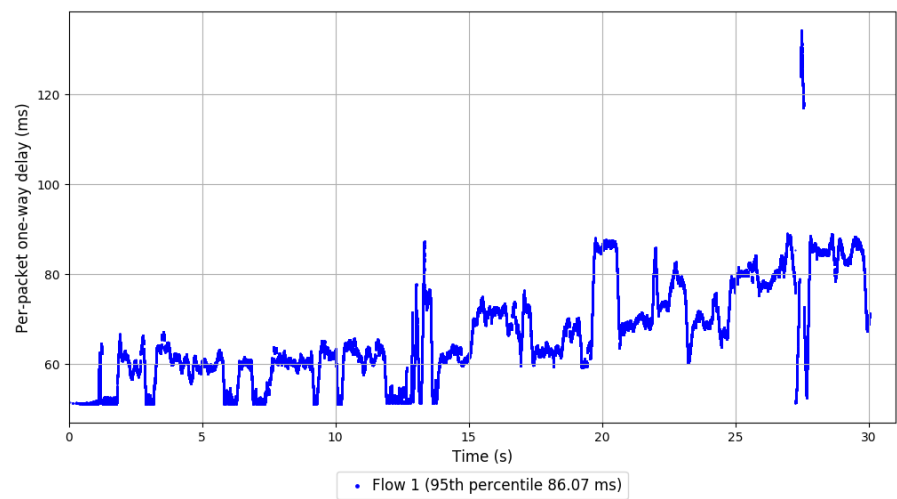
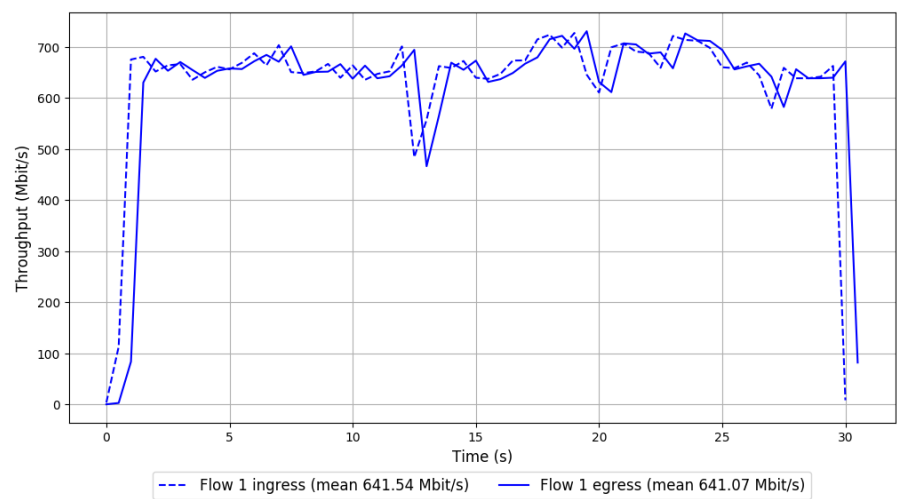


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 10:20:55
End at: 2018-08-28 10:21:25
Local clock offset: -0.8 ms
Remote clock offset: -0.266 ms

Below is generated by plot.py at 2018-08-28 10:46:34
Datalink statistics
-- Total of 1 flow:
Average throughput: 641.07 Mbit/s
95th percentile per-packet one-way delay: 86.074 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 641.07 Mbit/s
95th percentile per-packet one-way delay: 86.074 ms
Loss rate: 0.07%

Run 1: Report of TCP Cubic — Data Link

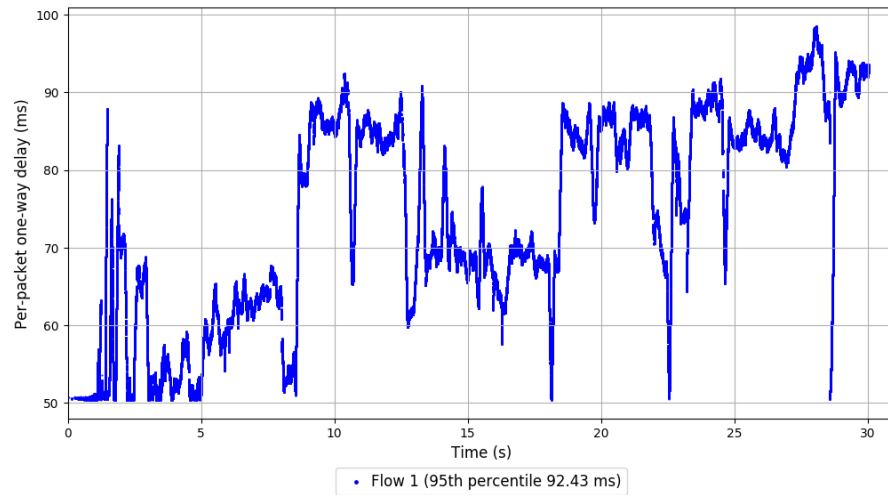
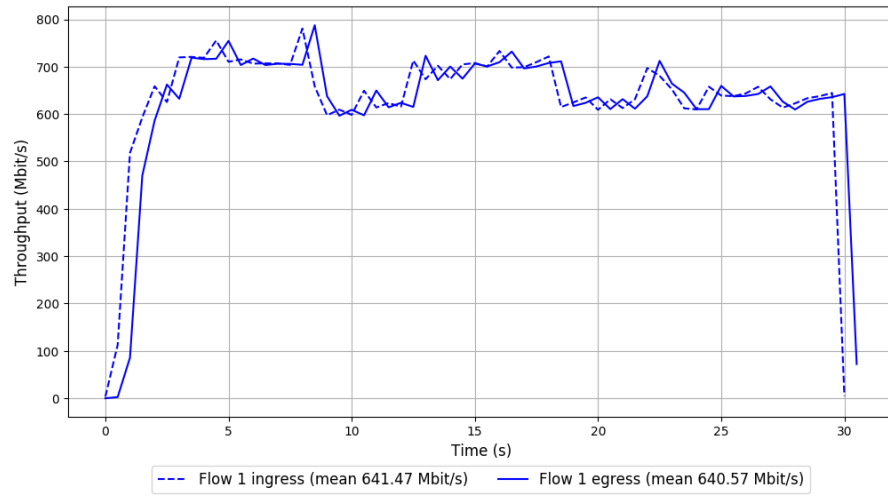


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 10:27:08
End at: 2018-08-28 10:27:38
Local clock offset: -0.41 ms
Remote clock offset: -0.313 ms

Below is generated by plot.py at 2018-08-28 10:46:36
Datalink statistics
-- Total of 1 flow:
Average throughput: 640.57 Mbit/s
95th percentile per-packet one-way delay: 92.426 ms
Loss rate: 0.14%
-- Flow 1:
Average throughput: 640.57 Mbit/s
95th percentile per-packet one-way delay: 92.426 ms
Loss rate: 0.14%

Run 2: Report of TCP Cubic — Data Link

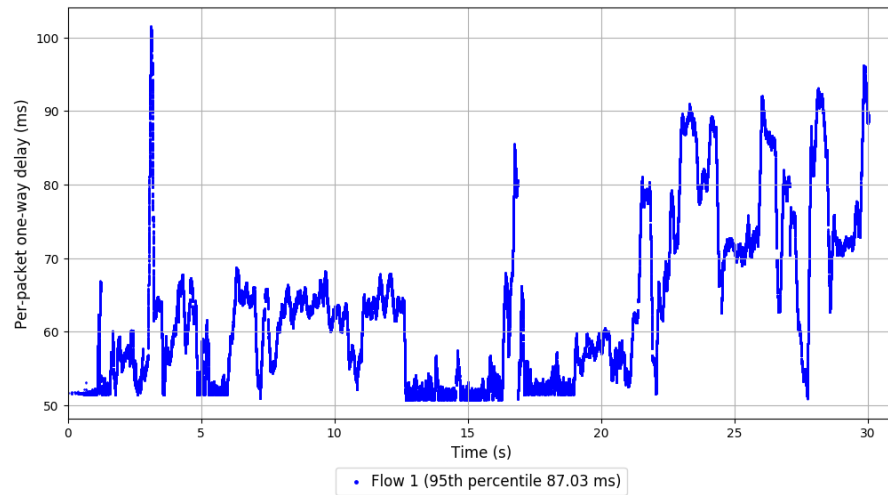
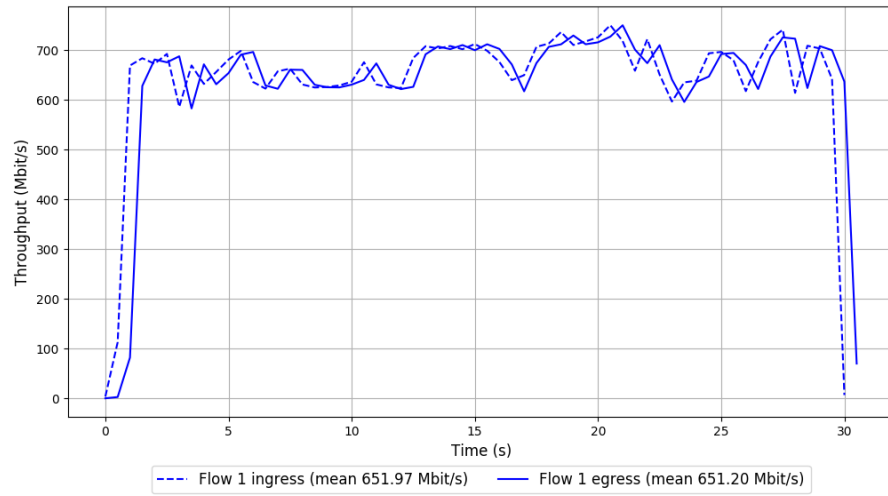


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 10:33:19
End at: 2018-08-28 10:33:49
Local clock offset: -1.095 ms
Remote clock offset: -0.387 ms

Below is generated by plot.py at 2018-08-28 10:46:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 651.20 Mbit/s
95th percentile per-packet one-way delay: 87.025 ms
Loss rate: 0.12%
-- Flow 1:
Average throughput: 651.20 Mbit/s
95th percentile per-packet one-way delay: 87.025 ms
Loss rate: 0.12%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-08-28 10:16:23

End at: 2018-08-28 10:16:53

Local clock offset: -0.099 ms

Remote clock offset: -0.182 ms

Below is generated by plot.py at 2018-08-28 10:46:41

Datalink statistics

-- Total of 1 flow:

Average throughput: 214.87 Mbit/s

95th percentile per-packet one-way delay: 50.615 ms

Loss rate: 0.00%

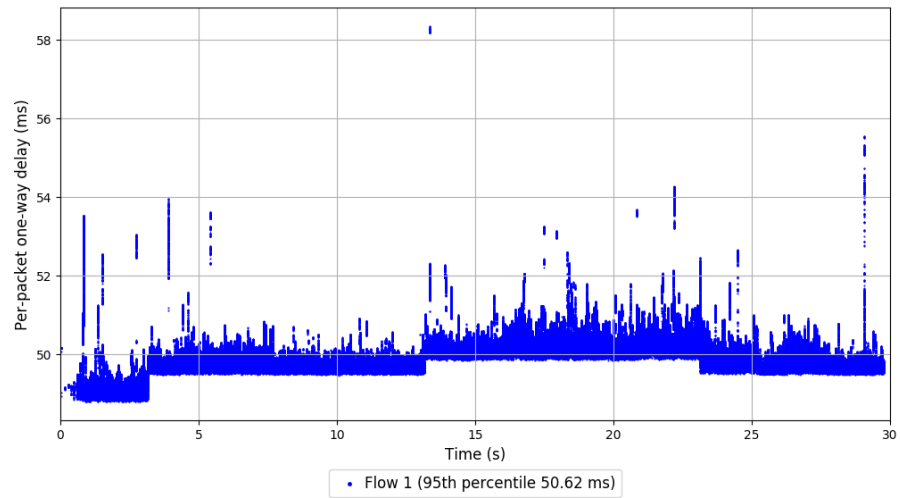
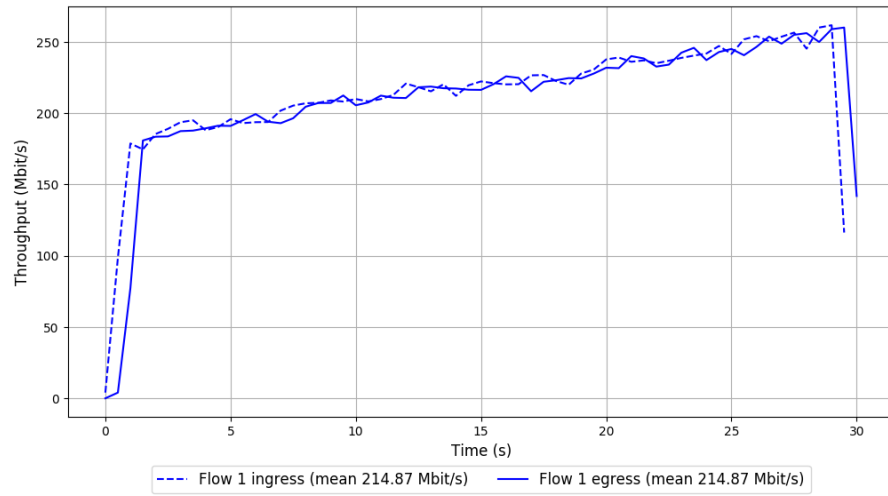
-- Flow 1:

Average throughput: 214.87 Mbit/s

95th percentile per-packet one-way delay: 50.615 ms

Loss rate: 0.00%

Run 1: Report of Indigo — Data Link

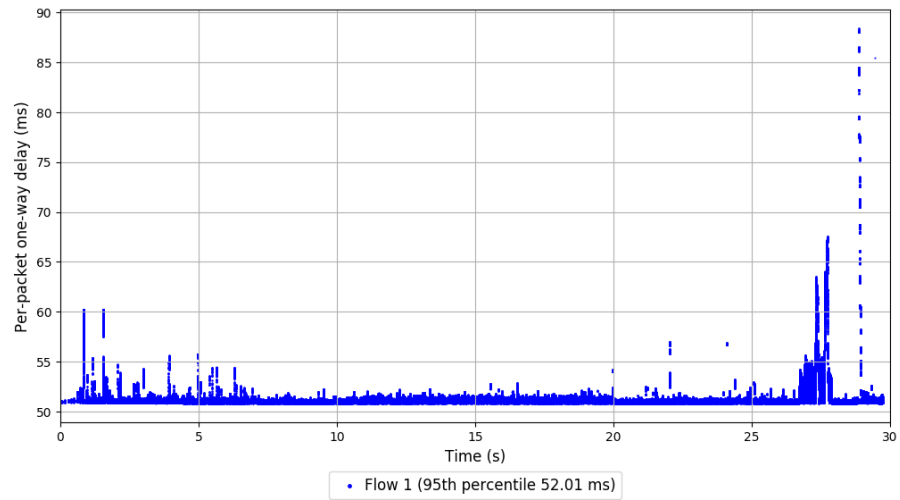
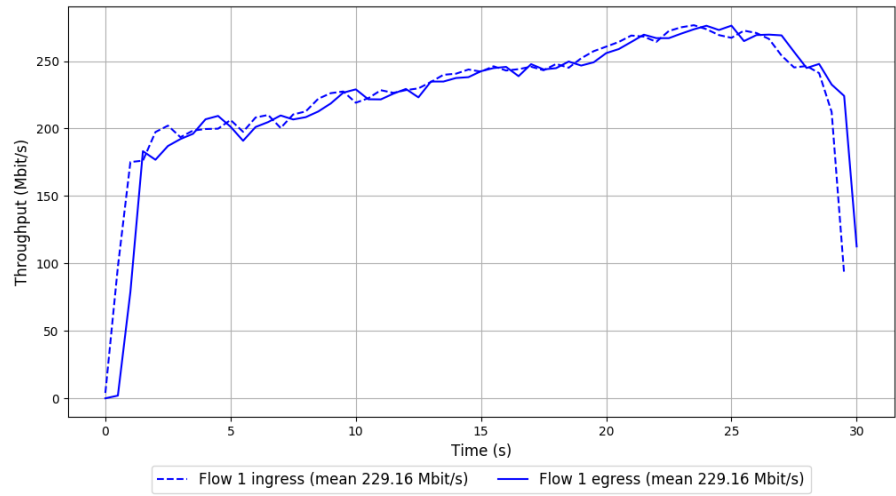


Run 2: Statistics of Indigo

Start at: 2018-08-28 10:22:31
End at: 2018-08-28 10:23:01
Local clock offset: -0.518 ms
Remote clock offset: -0.277 ms

Below is generated by plot.py at 2018-08-28 10:46:41
Datalink statistics
-- Total of 1 flow:
Average throughput: 229.16 Mbit/s
95th percentile per-packet one-way delay: 52.008 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 229.16 Mbit/s
95th percentile per-packet one-way delay: 52.008 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link

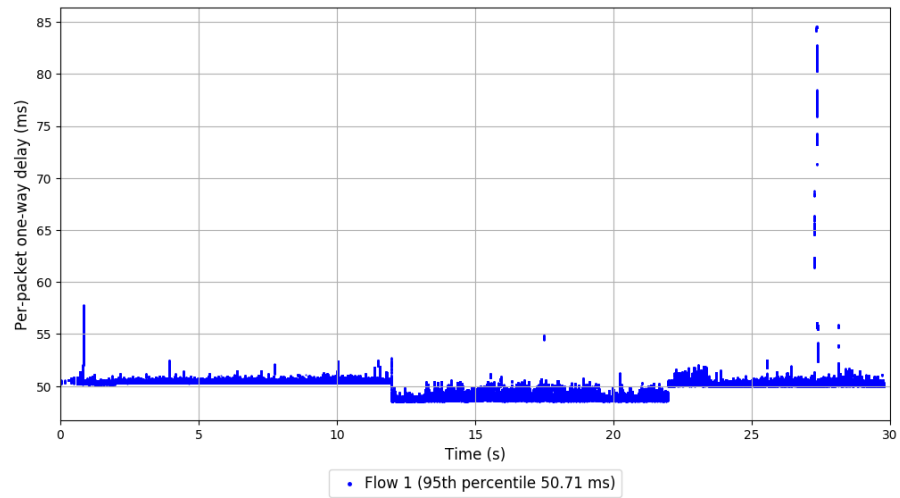
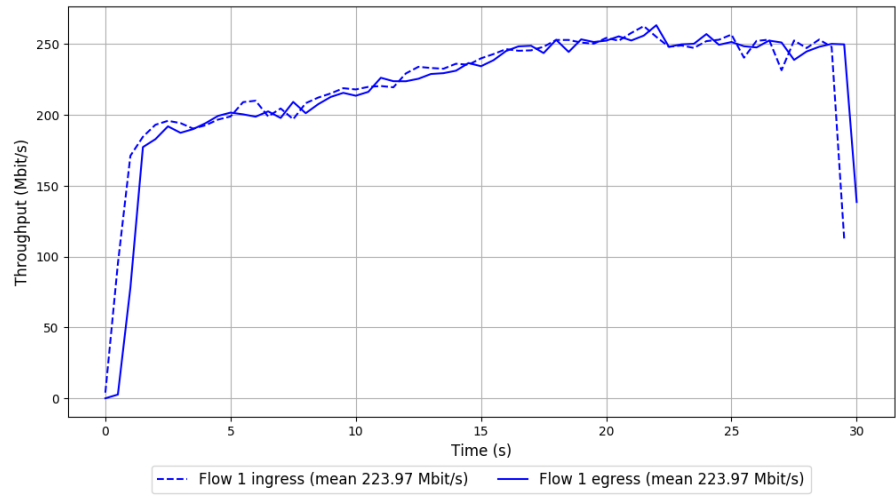


Run 3: Statistics of Indigo

Start at: 2018-08-28 10:28:44
End at: 2018-08-28 10:29:14
Local clock offset: 0.159 ms
Remote clock offset: -0.295 ms

Below is generated by plot.py at 2018-08-28 10:47:48
Datalink statistics
-- Total of 1 flow:
Average throughput: 223.97 Mbit/s
95th percentile per-packet one-way delay: 50.709 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 223.97 Mbit/s
95th percentile per-packet one-way delay: 50.709 ms
Loss rate: 0.00%

Run 3: Report of Indigo — Data Link

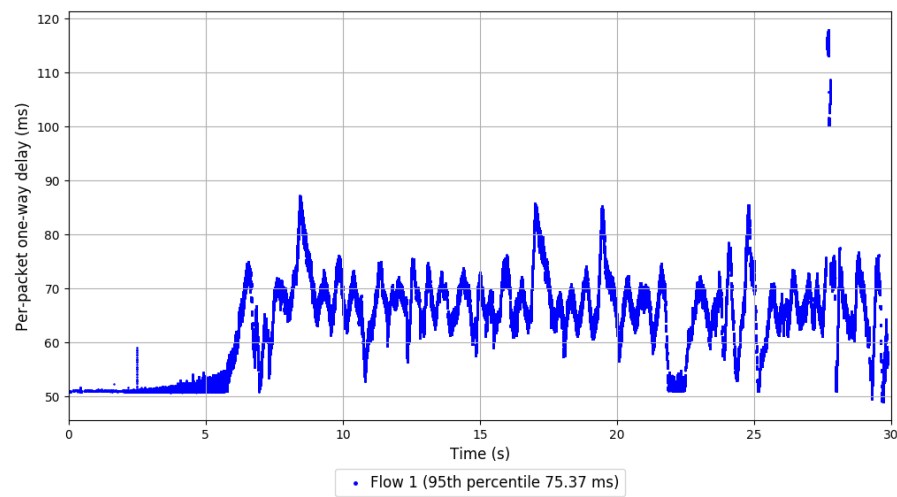
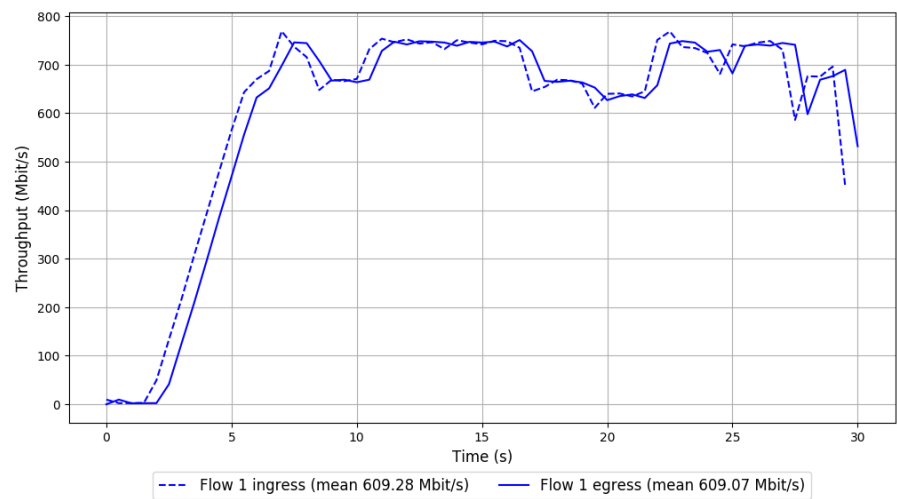


Run 1: Statistics of Muses

Start at: 2018-08-28 10:17:47
End at: 2018-08-28 10:18:17
Local clock offset: -0.226 ms
Remote clock offset: -0.167 ms

Below is generated by plot.py at 2018-08-28 10:50:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 609.07 Mbit/s
95th percentile per-packet one-way delay: 75.374 ms
Loss rate: 0.04%
-- Flow 1:
Average throughput: 609.07 Mbit/s
95th percentile per-packet one-way delay: 75.374 ms
Loss rate: 0.04%

Run 1: Report of Muses — Data Link

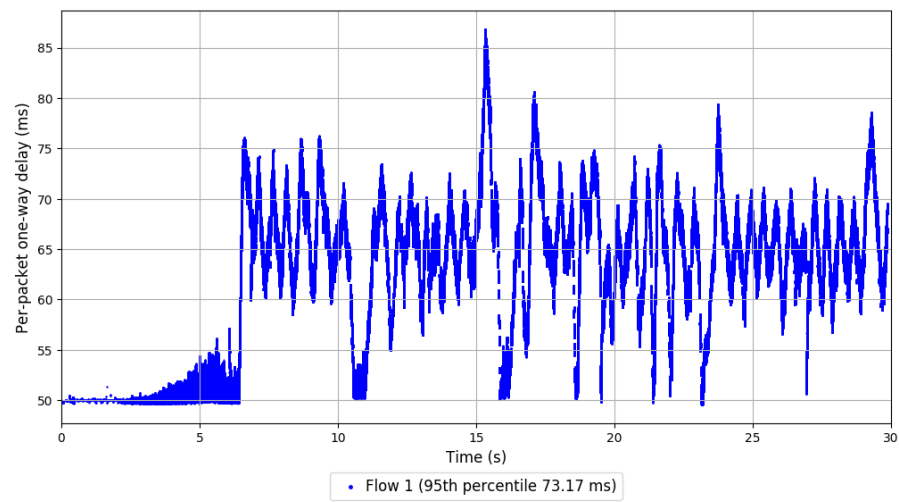
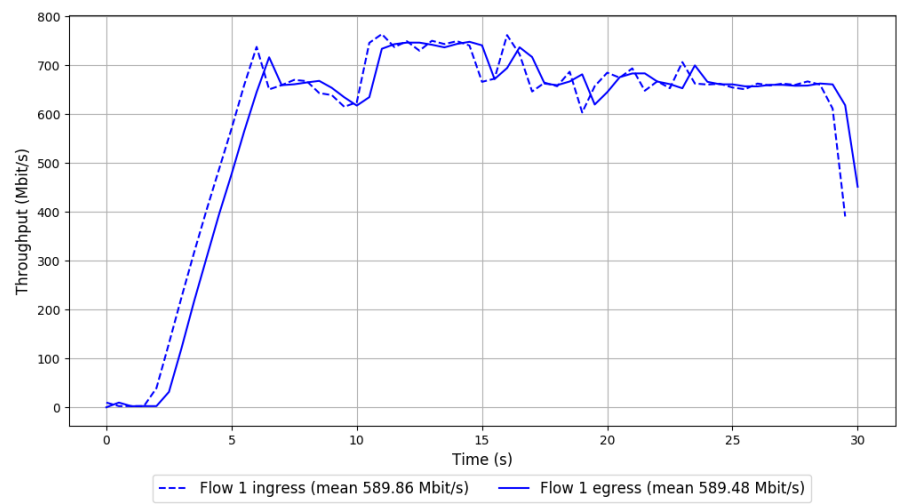


Run 2: Statistics of Muses

Start at: 2018-08-28 10:23:57
End at: 2018-08-28 10:24:27
Local clock offset: -0.106 ms
Remote clock offset: -0.288 ms

Below is generated by plot.py at 2018-08-28 10:50:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 589.48 Mbit/s
95th percentile per-packet one-way delay: 73.175 ms
Loss rate: 0.06%
-- Flow 1:
Average throughput: 589.48 Mbit/s
95th percentile per-packet one-way delay: 73.175 ms
Loss rate: 0.06%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 10:30:09
End at: 2018-08-28 10:30:39
Local clock offset: -1.067 ms
Remote clock offset: -0.329 ms

Below is generated by plot.py at 2018-08-28 10:50:49
Datalink statistics
-- Total of 1 flow:
Average throughput: 585.54 Mbit/s
95th percentile per-packet one-way delay: 78.333 ms
Loss rate: 0.09%
-- Flow 1:
Average throughput: 585.54 Mbit/s
95th percentile per-packet one-way delay: 78.333 ms
Loss rate: 0.09%

Run 3: Report of Muses — Data Link

