

Pantheon Report

Generated at 2018-08-28 10:49:49 (UTC).

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

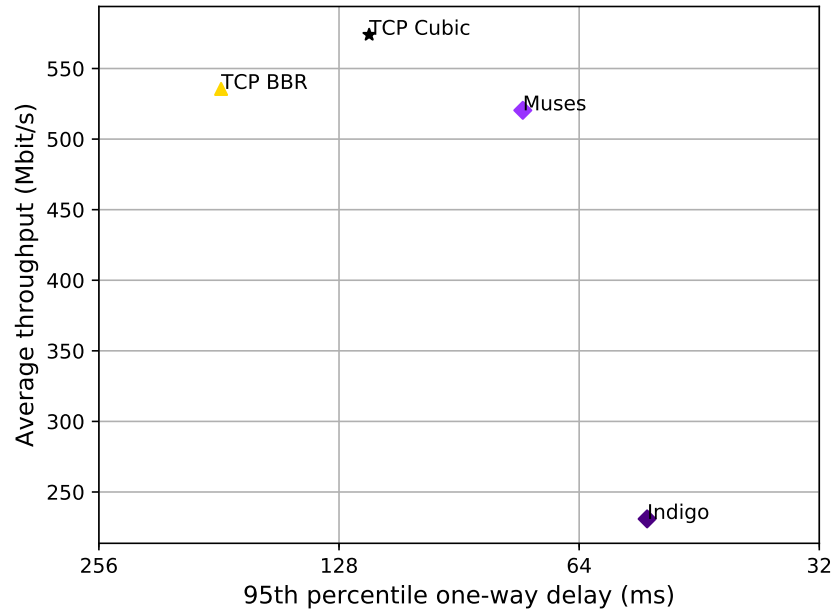
System info:

```
Linux 4.15.0-1015-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
```

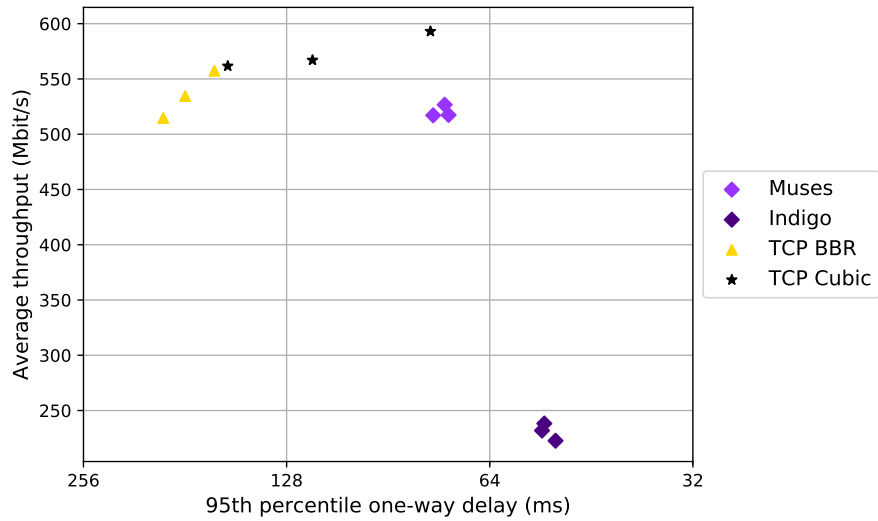
Git summary:

```
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 @ cbf6e6db5ff5740dfe1771f813cd646339e1952
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 Sydney to GCE Tokyo, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE Sydney to GCE Tokyo, 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	535.54	179.90	1.36
TCP Cubic	3	573.90	117.33	0.10
Indigo	3	230.93	52.60	0.00
Muses	3	520.38	75.30	0.04

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 10:20:52

End at: 2018-08-28 10:21:22

Local clock offset: 0.177 ms

Remote clock offset: -2.923 ms

Below is generated by plot.py at 2018-08-28 10:45:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 557.38 Mbit/s

95th percentile per-packet one-way delay: 163.748 ms

Loss rate: 1.29%

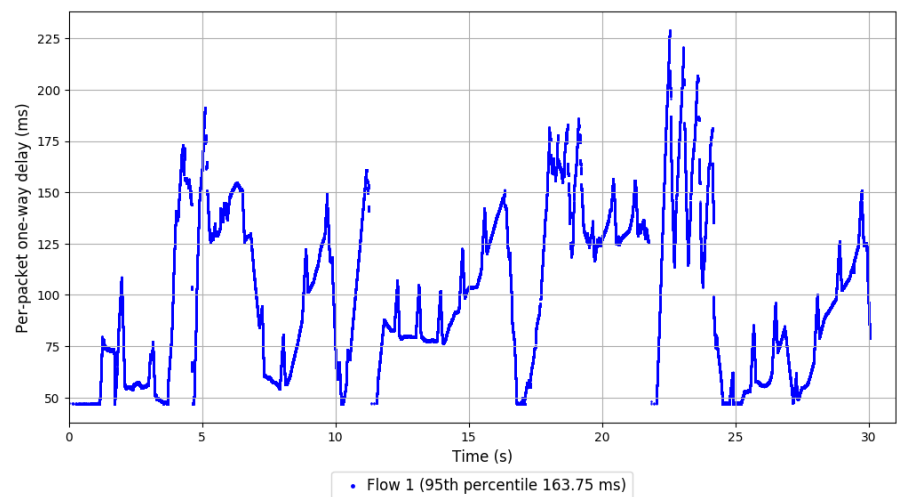
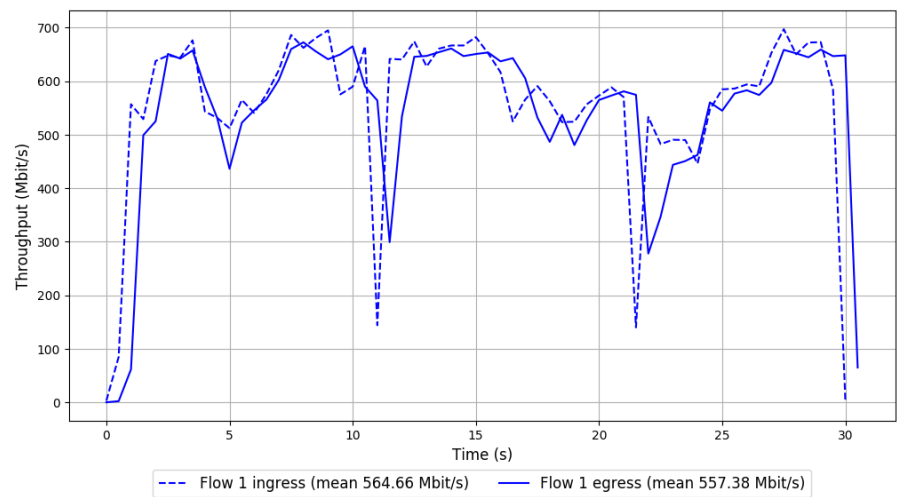
-- Flow 1:

Average throughput: 557.38 Mbit/s

95th percentile per-packet one-way delay: 163.748 ms

Loss rate: 1.29%

Run 1: Report of TCP BBR — Data Link

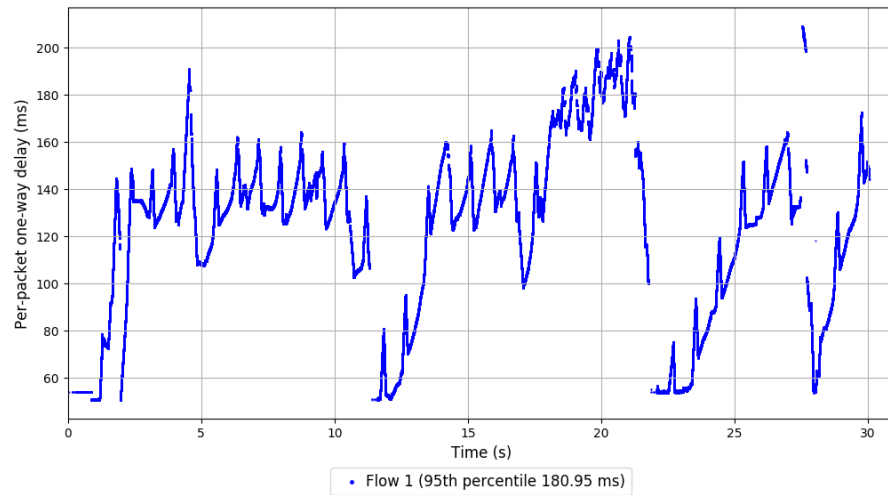
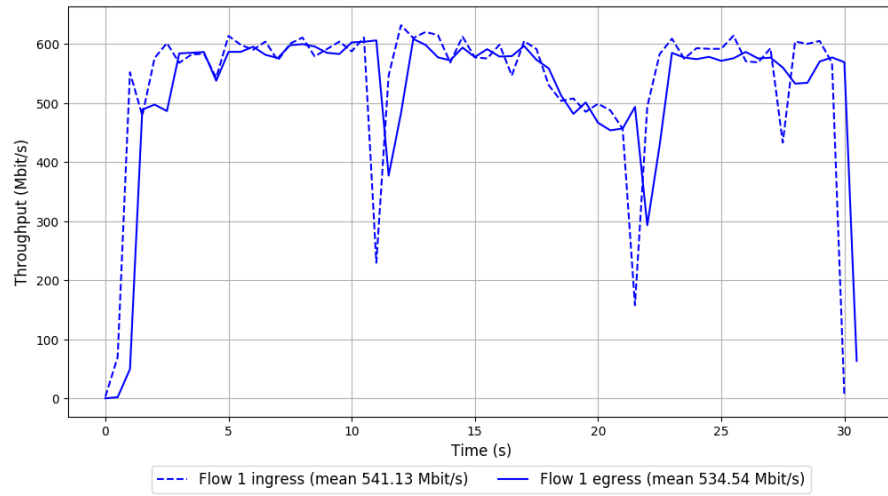


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 10:26:57
End at: 2018-08-28 10:27:27
Local clock offset: -0.235 ms
Remote clock offset: -0.046 ms

Below is generated by plot.py at 2018-08-28 10:45:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 534.54 Mbit/s
95th percentile per-packet one-way delay: 180.954 ms
Loss rate: 1.22%
-- Flow 1:
Average throughput: 534.54 Mbit/s
95th percentile per-packet one-way delay: 180.954 ms
Loss rate: 1.22%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 10:33:00

End at: 2018-08-28 10:33:30

Local clock offset: -0.005 ms

Remote clock offset: 3.013 ms

Below is generated by plot.py at 2018-08-28 10:45:14

Datalink statistics

-- Total of 1 flow:

Average throughput: 514.71 Mbit/s

95th percentile per-packet one-way delay: 194.992 ms

Loss rate: 1.57%

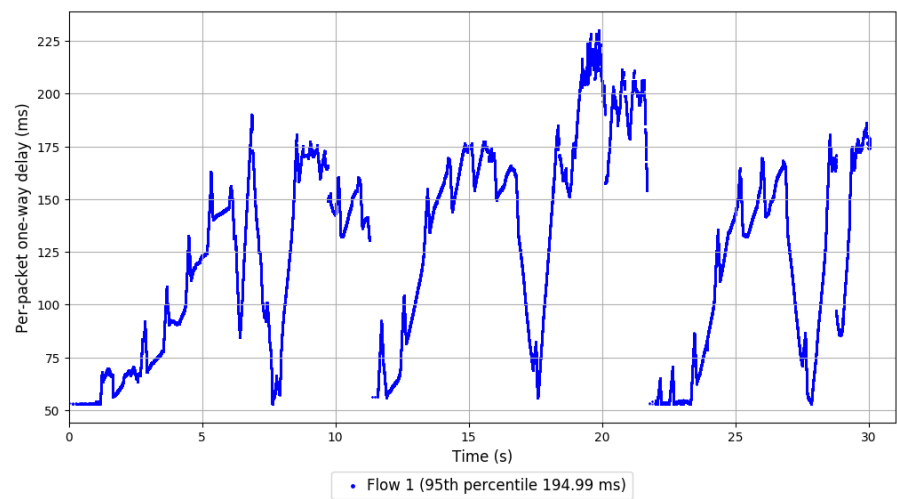
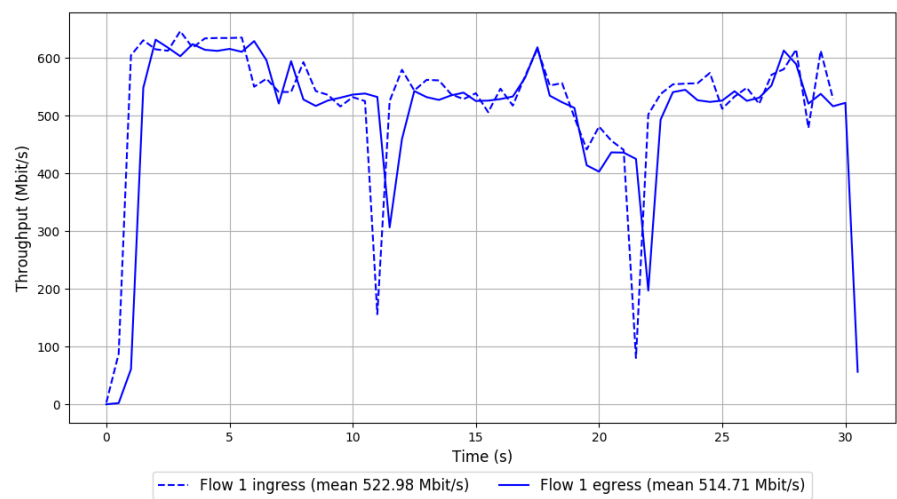
-- Flow 1:

Average throughput: 514.71 Mbit/s

95th percentile per-packet one-way delay: 194.992 ms

Loss rate: 1.57%

Run 3: Report of TCP BBR — Data Link

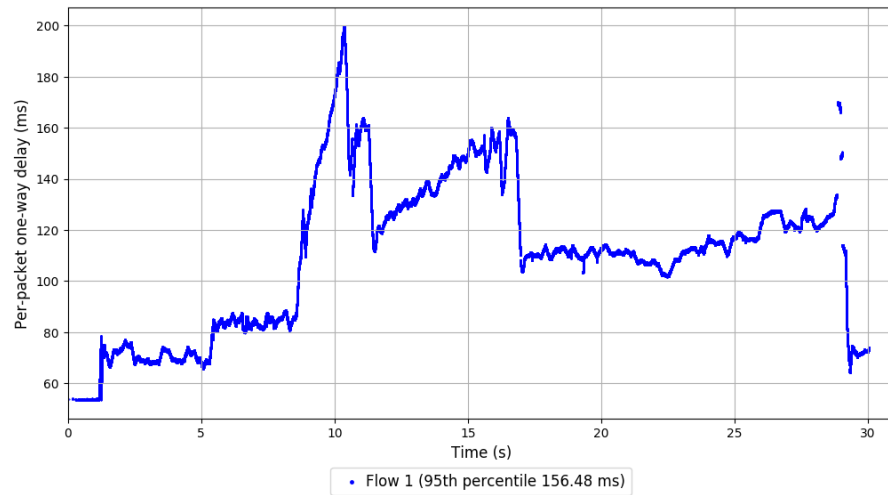
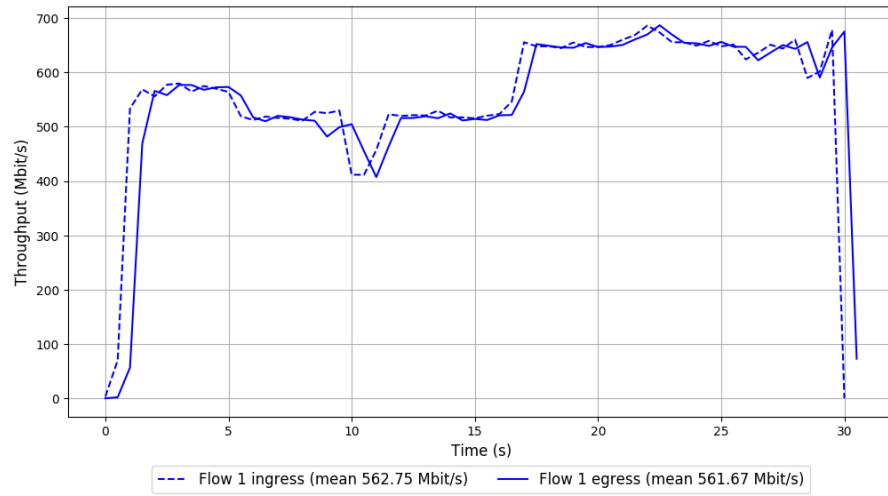


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 10:16:22
End at: 2018-08-28 10:16:52
Local clock offset: -0.017 ms
Remote clock offset: -0.067 ms

Below is generated by plot.py at 2018-08-28 10:45:17
Datalink statistics
-- Total of 1 flow:
Average throughput: 561.67 Mbit/s
95th percentile per-packet one-way delay: 156.477 ms
Loss rate: 0.19%
-- Flow 1:
Average throughput: 561.67 Mbit/s
95th percentile per-packet one-way delay: 156.477 ms
Loss rate: 0.19%

Run 1: Report of TCP Cubic — Data Link

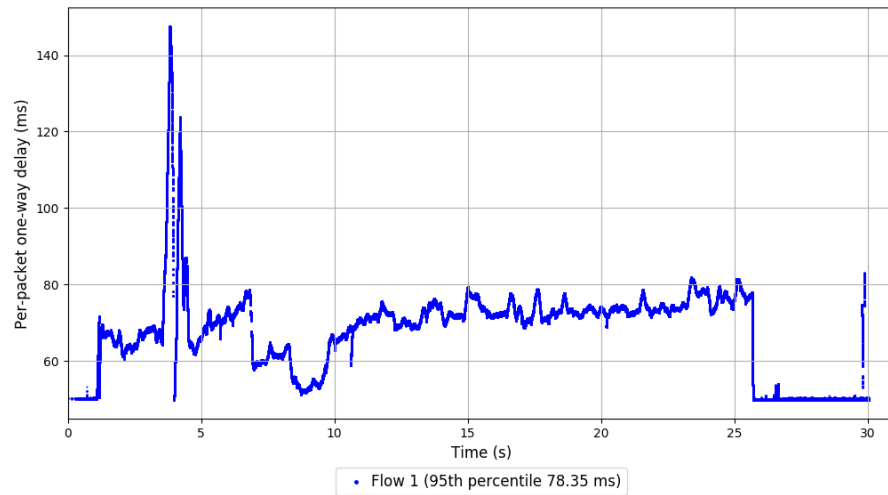
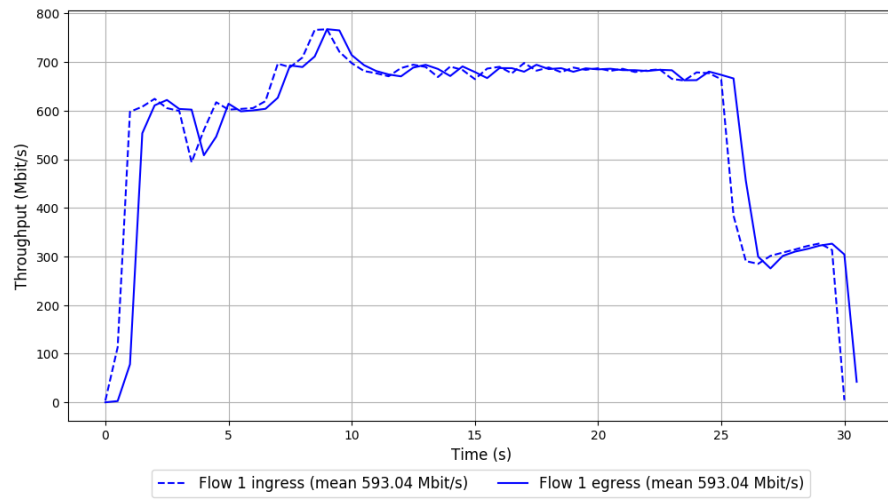


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 10:22:26
End at: 2018-08-28 10:22:56
Local clock offset: 0.149 ms
Remote clock offset: -0.222 ms

Below is generated by plot.py at 2018-08-28 10:45:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 593.04 Mbit/s
95th percentile per-packet one-way delay: 78.349 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 593.04 Mbit/s
95th percentile per-packet one-way delay: 78.349 ms
Loss rate: 0.00%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 10:28:30

End at: 2018-08-28 10:29:00

Local clock offset: 0.037 ms

Remote clock offset: 2.746 ms

Below is generated by plot.py at 2018-08-28 10:45:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 567.00 Mbit/s

95th percentile per-packet one-way delay: 117.177 ms

Loss rate: 0.12%

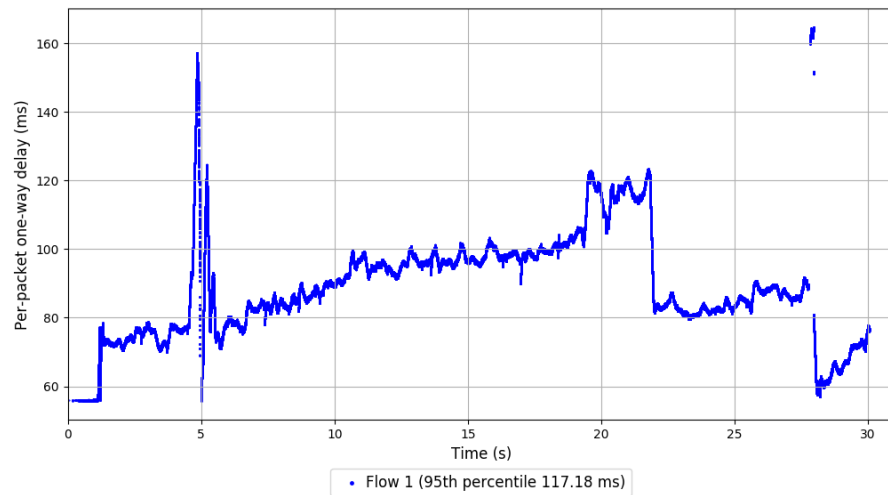
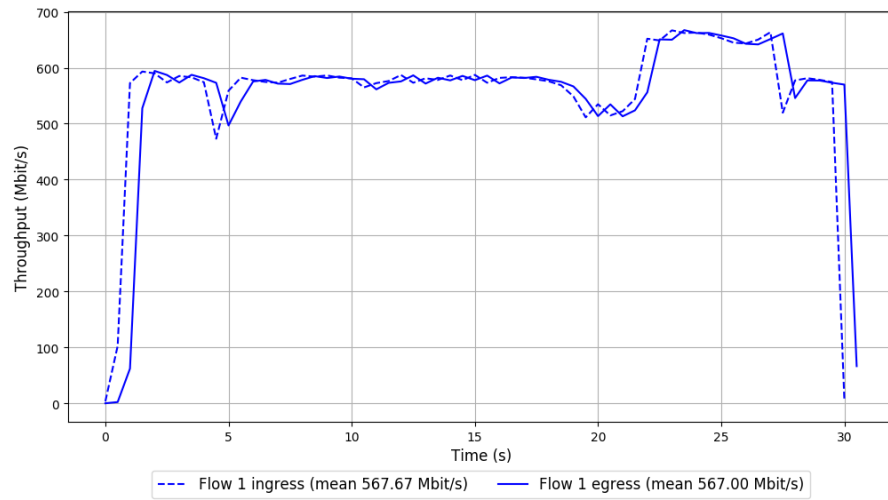
-- Flow 1:

Average throughput: 567.00 Mbit/s

95th percentile per-packet one-way delay: 117.177 ms

Loss rate: 0.12%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-08-28 10:17:55

End at: 2018-08-28 10:18:25

Local clock offset: 0.148 ms

Remote clock offset: -0.089 ms

Below is generated by plot.py at 2018-08-28 10:45:37

Datalink statistics

-- Total of 1 flow:

Average throughput: 231.88 Mbit/s

95th percentile per-packet one-way delay: 53.546 ms

Loss rate: 0.00%

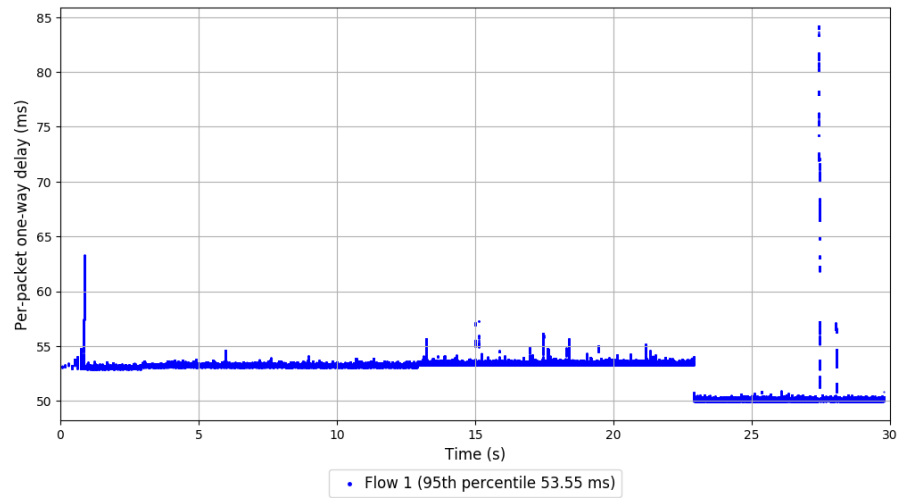
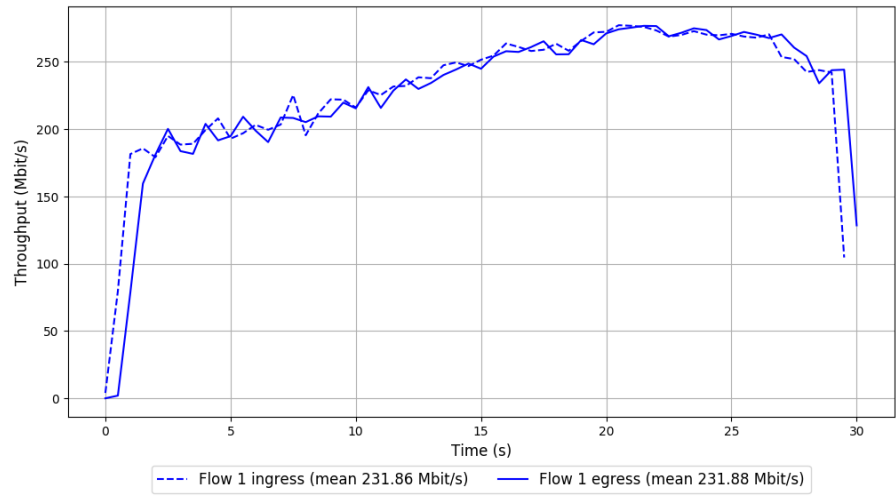
-- Flow 1:

Average throughput: 231.88 Mbit/s

95th percentile per-packet one-way delay: 53.546 ms

Loss rate: 0.00%

Run 1: Report of Indigo — Data Link

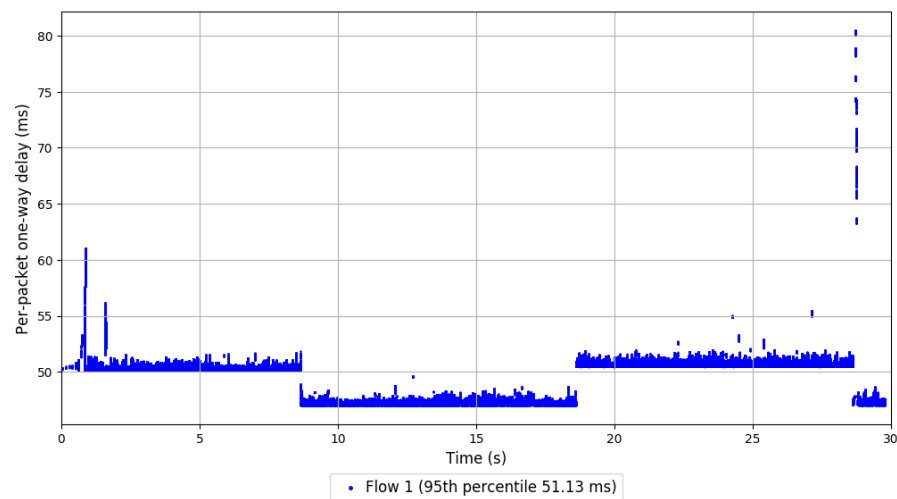
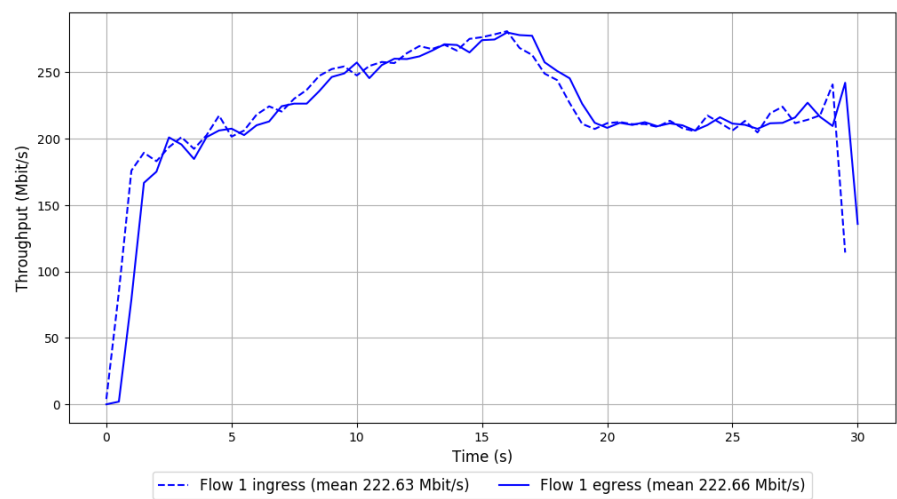


Run 2: Statistics of Indigo

Start at: 2018-08-28 10:23:59
End at: 2018-08-28 10:24:29
Local clock offset: -0.017 ms
Remote clock offset: -3.075 ms

Below is generated by plot.py at 2018-08-28 10:45:37
Datalink statistics
-- Total of 1 flow:
Average throughput: 222.66 Mbit/s
95th percentile per-packet one-way delay: 51.129 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 222.66 Mbit/s
95th percentile per-packet one-way delay: 51.129 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link

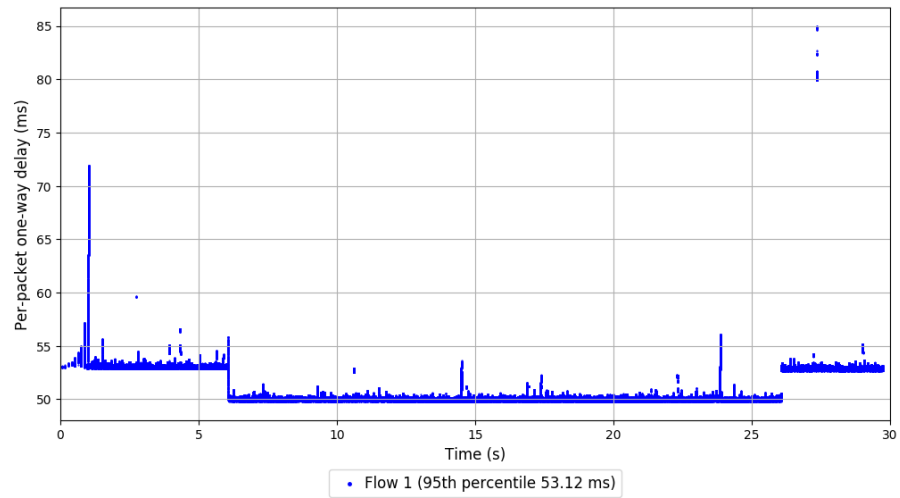
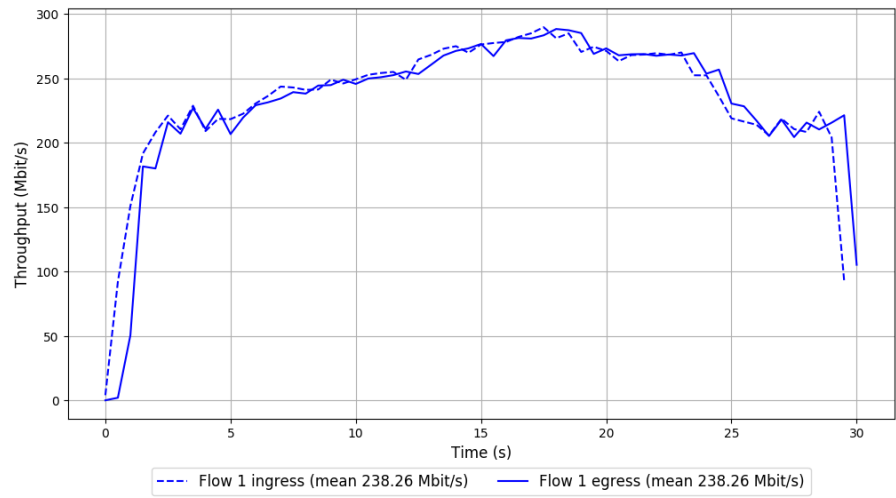


Run 3: Statistics of Indigo

Start at: 2018-08-28 10:30:02
End at: 2018-08-28 10:30:32
Local clock offset: 0.237 ms
Remote clock offset: -0.086 ms

Below is generated by plot.py at 2018-08-28 10:47:30
Datalink statistics
-- Total of 1 flow:
Average throughput: 238.26 Mbit/s
95th percentile per-packet one-way delay: 53.125 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 238.26 Mbit/s
95th percentile per-packet one-way delay: 53.125 ms
Loss rate: 0.00%

Run 3: Report of Indigo — Data Link

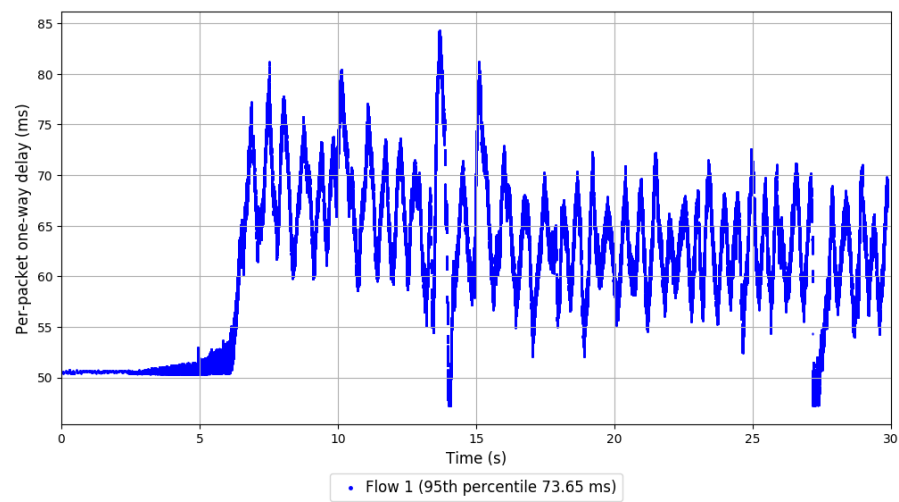
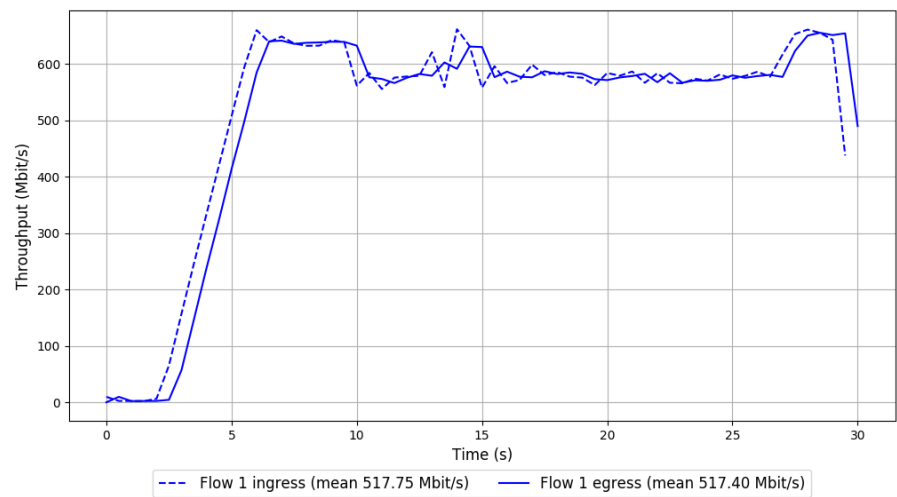


Run 1: Statistics of Muses

Start at: 2018-08-28 10:19:20
End at: 2018-08-28 10:19:50
Local clock offset: 0.071 ms
Remote clock offset: -2.938 ms

Below is generated by plot.py at 2018-08-28 10:49:35
Datalink statistics
-- Total of 1 flow:
Average throughput: 517.40 Mbit/s
95th percentile per-packet one-way delay: 73.649 ms
Loss rate: 0.07%
-- Flow 1:
Average throughput: 517.40 Mbit/s
95th percentile per-packet one-way delay: 73.649 ms
Loss rate: 0.07%

Run 1: Report of Muses — Data Link

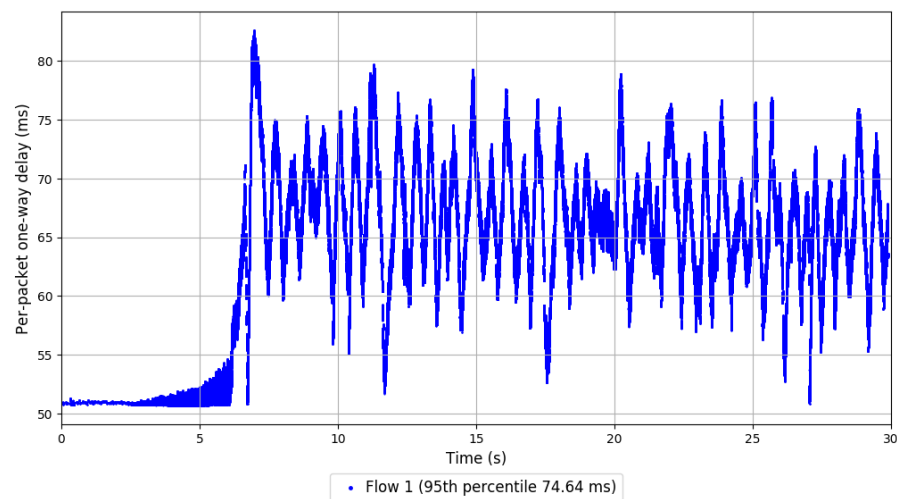
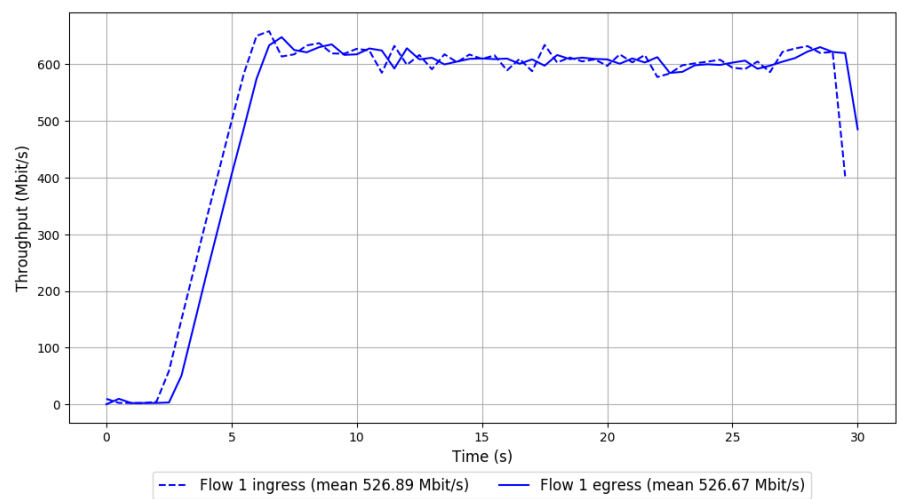


Run 2: Statistics of Muses

Start at: 2018-08-28 10:25:24
End at: 2018-08-28 10:25:54
Local clock offset: -0.0 ms
Remote clock offset: -2.803 ms

Below is generated by plot.py at 2018-08-28 10:49:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 526.67 Mbit/s
95th percentile per-packet one-way delay: 74.640 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 526.67 Mbit/s
95th percentile per-packet one-way delay: 74.640 ms
Loss rate: 0.00%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 10:31:28
End at: 2018-08-28 10:31:58
Local clock offset: -0.002 ms
Remote clock offset: 2.763 ms

Below is generated by plot.py at 2018-08-28 10:49:47
Datalink statistics
-- Total of 1 flow:
Average throughput: 517.06 Mbit/s
95th percentile per-packet one-way delay: 77.624 ms
Loss rate: 0.05%
-- Flow 1:
Average throughput: 517.06 Mbit/s
95th percentile per-packet one-way delay: 77.624 ms
Loss rate: 0.05%

Run 3: Report of Muses — Data Link

