

Pantheon Report

Generated at 2018-08-28 05:18:26 (UTC).

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

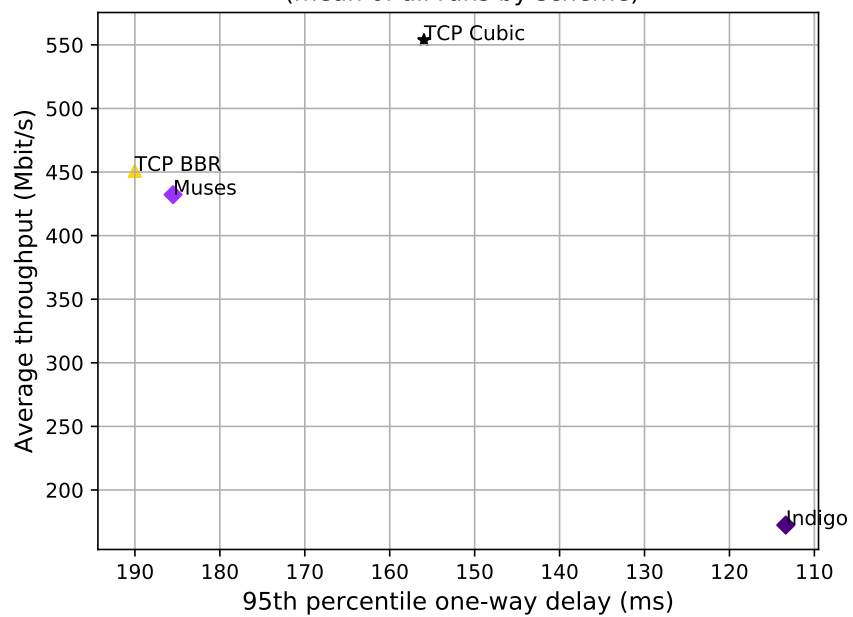
System info:

```
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
```

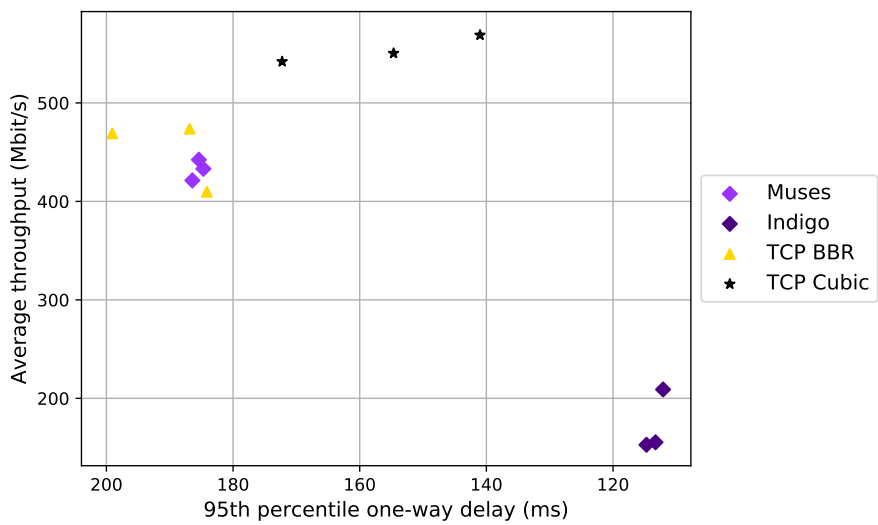
Git summary:

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



test from GCE Tokyo to GCE London, 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	450.88	190.02	0.35
TCP Cubic	3	553.74	155.97	0.06
Indigo	3	172.41	113.37	0.00
Muses	3	432.24	185.51	2.07

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 04:51:48

End at: 2018-08-28 04:52:18

Local clock offset: 2.941 ms

Remote clock offset: -0.342 ms

Below is generated by plot.py at 2018-08-28 05:14:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 409.74 Mbit/s

95th percentile per-packet one-way delay: 184.134 ms

Loss rate: 0.39%

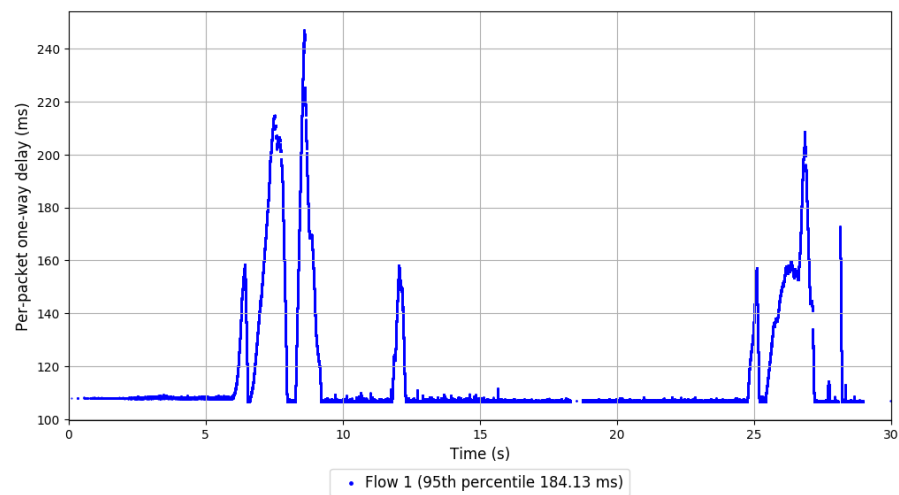
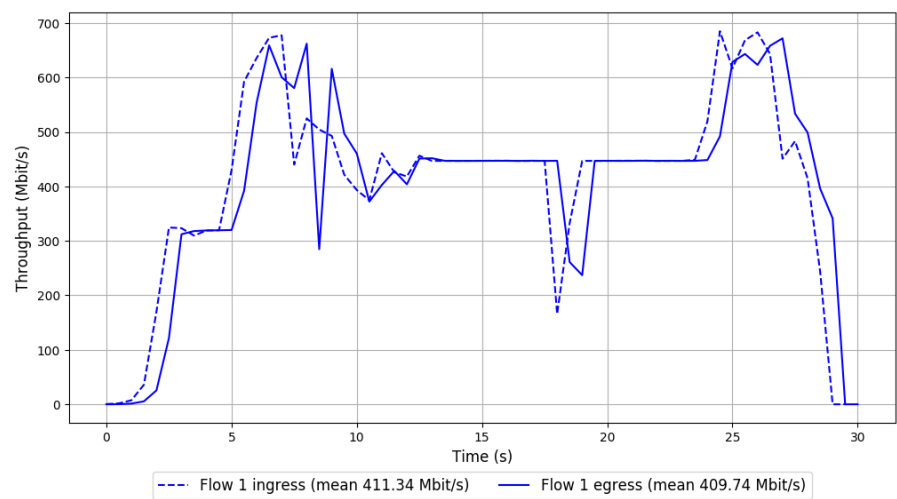
-- Flow 1:

Average throughput: 409.74 Mbit/s

95th percentile per-packet one-way delay: 184.134 ms

Loss rate: 0.39%

Run 1: Report of TCP BBR — Data Link

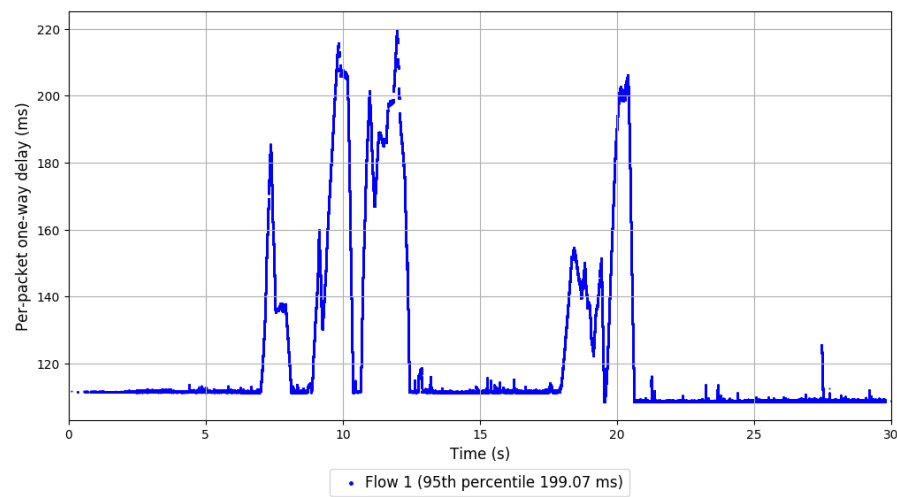
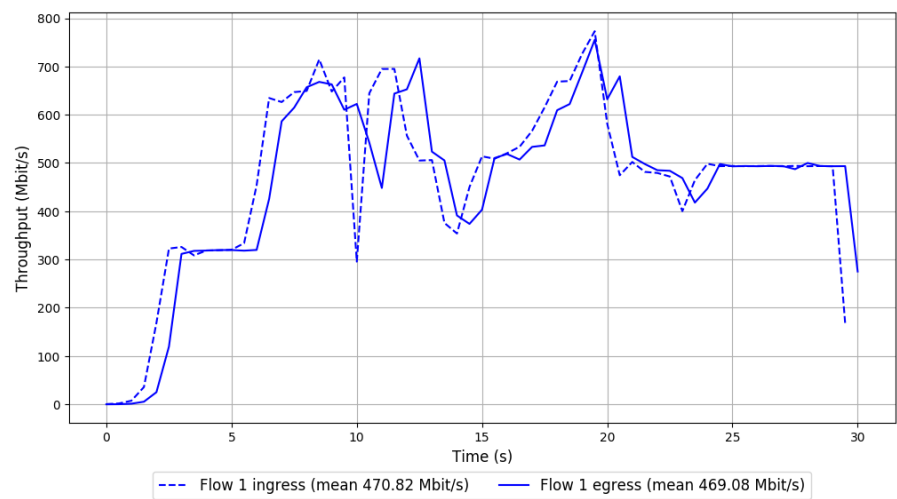


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 04:57:55
End at: 2018-08-28 04:58:25
Local clock offset: -0.095 ms
Remote clock offset: -0.152 ms

Below is generated by plot.py at 2018-08-28 05:15:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 469.08 Mbit/s
95th percentile per-packet one-way delay: 199.072 ms
Loss rate: 0.38%
-- Flow 1:
Average throughput: 469.08 Mbit/s
95th percentile per-packet one-way delay: 199.072 ms
Loss rate: 0.38%

Run 2: Report of TCP BBR — Data Link

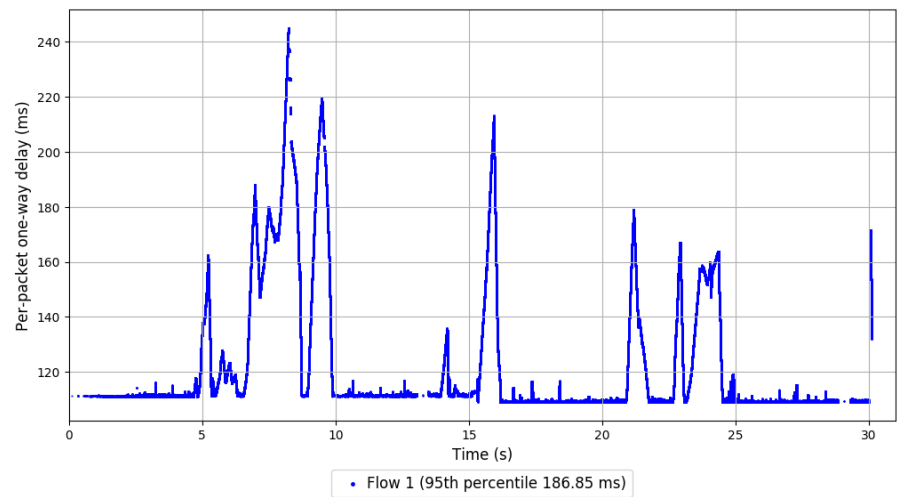
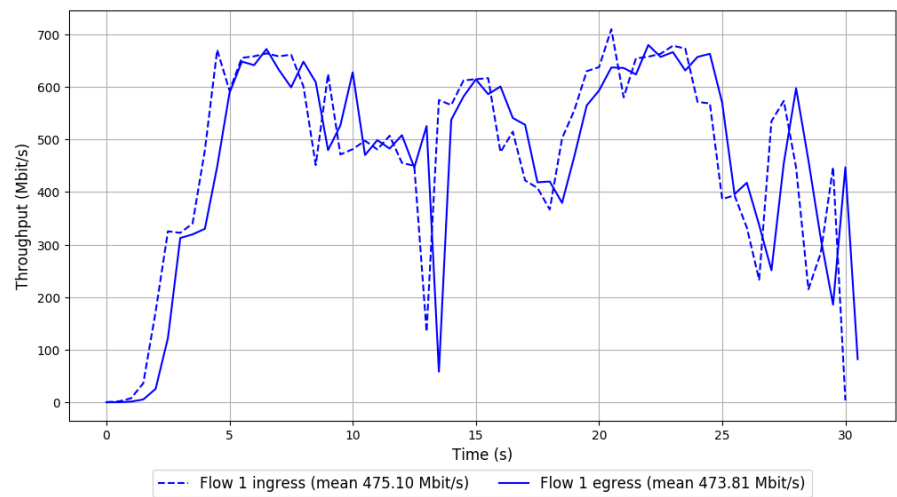


Run 3: Statistics of TCP BBR

Start at: 2018-08-28 05:04:11
End at: 2018-08-28 05:04:41
Local clock offset: -0.125 ms
Remote clock offset: -0.411 ms

Below is generated by plot.py at 2018-08-28 05:15:06
Datalink statistics
-- Total of 1 flow:
Average throughput: 473.81 Mbit/s
95th percentile per-packet one-way delay: 186.855 ms
Loss rate: 0.28%
-- Flow 1:
Average throughput: 473.81 Mbit/s
95th percentile per-packet one-way delay: 186.855 ms
Loss rate: 0.28%

Run 3: Report of TCP BBR — Data Link

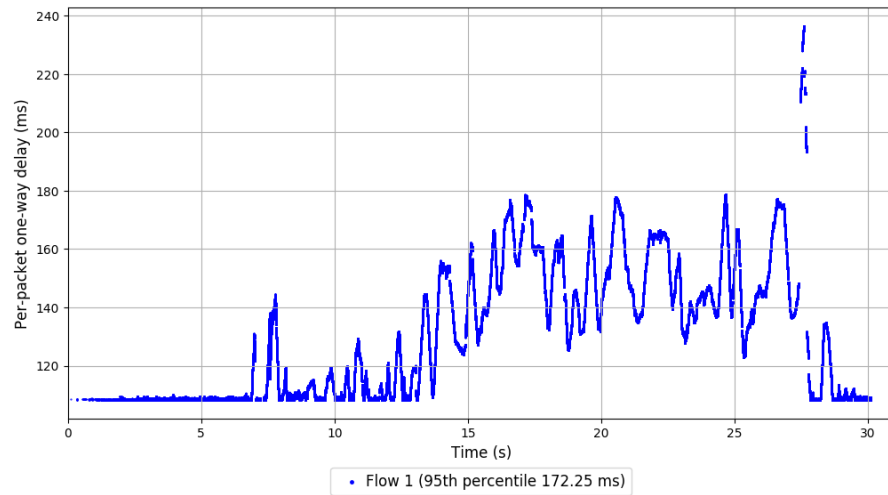
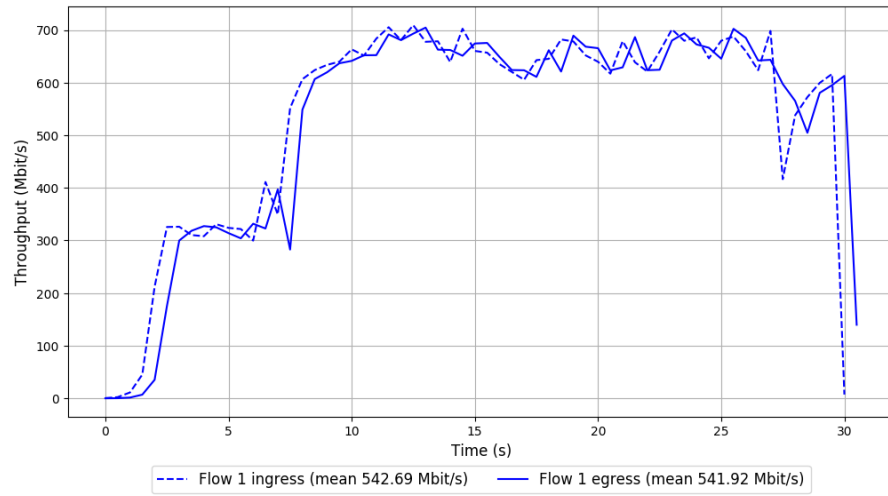


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 04:50:11
End at: 2018-08-28 04:50:41
Local clock offset: 2.723 ms
Remote clock offset: -0.342 ms

Below is generated by plot.py at 2018-08-28 05:15:45
Datalink statistics
-- Total of 1 flow:
Average throughput: 541.92 Mbit/s
95th percentile per-packet one-way delay: 172.248 ms
Loss rate: 0.15%
-- Flow 1:
Average throughput: 541.92 Mbit/s
95th percentile per-packet one-way delay: 172.248 ms
Loss rate: 0.15%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 04:56:17

End at: 2018-08-28 04:56:47

Local clock offset: 2.632 ms

Remote clock offset: -0.46 ms

Below is generated by plot.py at 2018-08-28 05:16:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 568.90 Mbit/s

95th percentile per-packet one-way delay: 141.003 ms

Loss rate: 0.00%

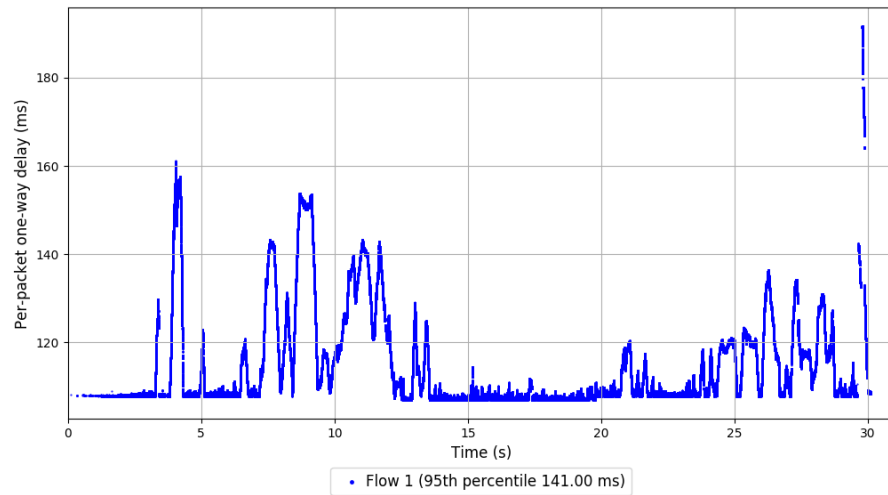
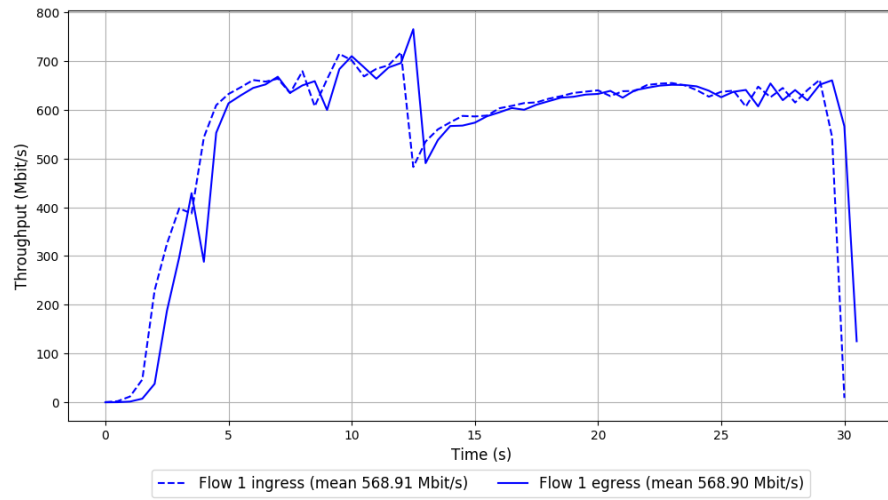
-- Flow 1:

Average throughput: 568.90 Mbit/s

95th percentile per-packet one-way delay: 141.003 ms

Loss rate: 0.00%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 05:02:33

End at: 2018-08-28 05:03:03

Local clock offset: 2.819 ms

Remote clock offset: -0.3 ms

Below is generated by plot.py at 2018-08-28 05:16:18

Datalink statistics

-- Total of 1 flow:

Average throughput: 550.41 Mbit/s

95th percentile per-packet one-way delay: 154.654 ms

Loss rate: 0.03%

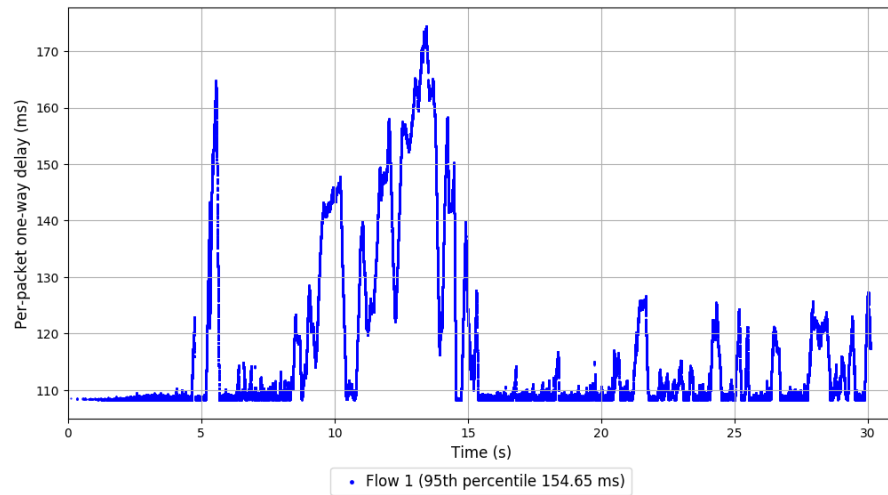
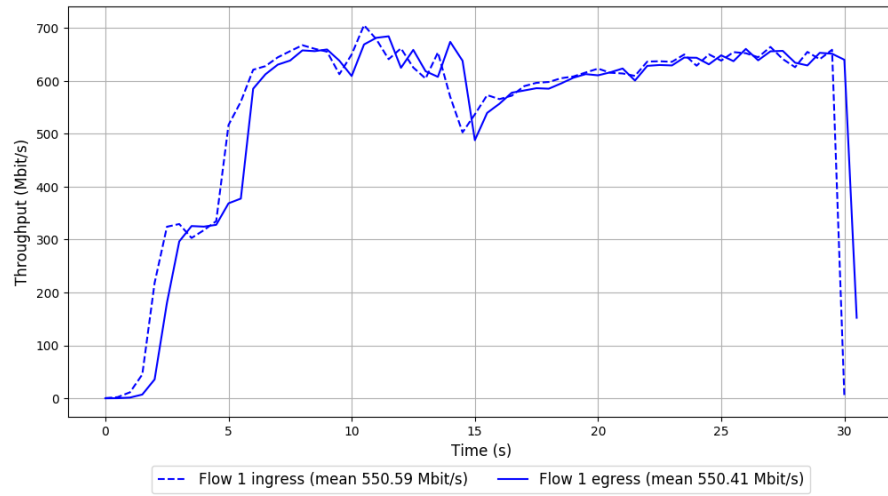
-- Flow 1:

Average throughput: 550.41 Mbit/s

95th percentile per-packet one-way delay: 154.654 ms

Loss rate: 0.03%

Run 3: Report of TCP Cubic — Data Link

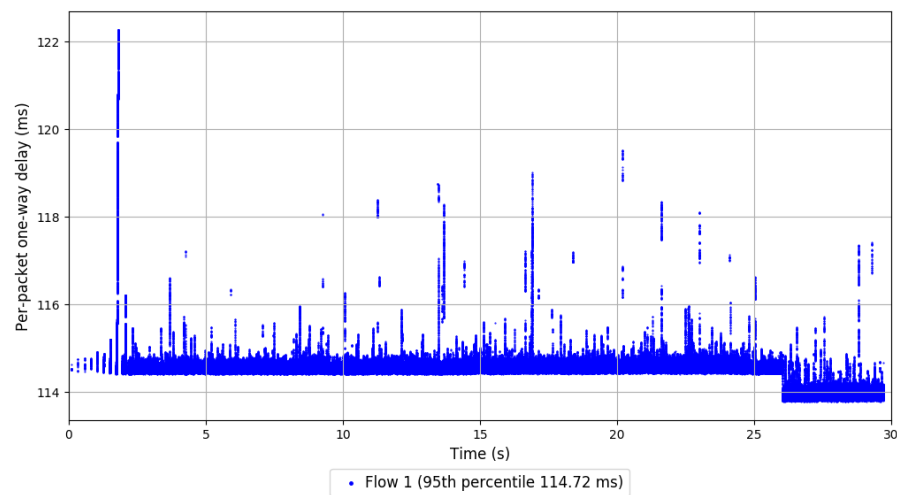
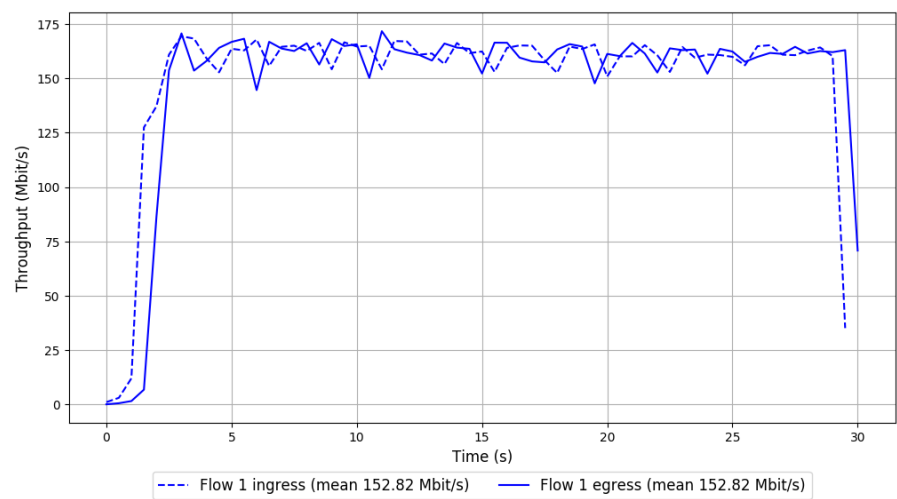


Run 1: Statistics of Indigo

Start at: 2018-08-28 04:48:48
End at: 2018-08-28 04:49:18
Local clock offset: -2.926 ms
Remote clock offset: -0.457 ms

Below is generated by plot.py at 2018-08-28 05:16:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 152.82 Mbit/s
95th percentile per-packet one-way delay: 114.719 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 152.82 Mbit/s
95th percentile per-packet one-way delay: 114.719 ms
Loss rate: 0.00%

Run 1: Report of Indigo — Data Link

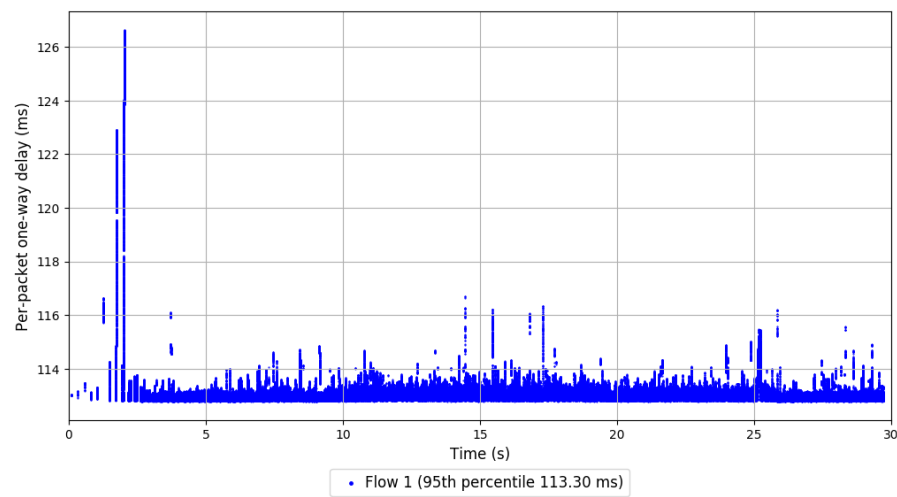
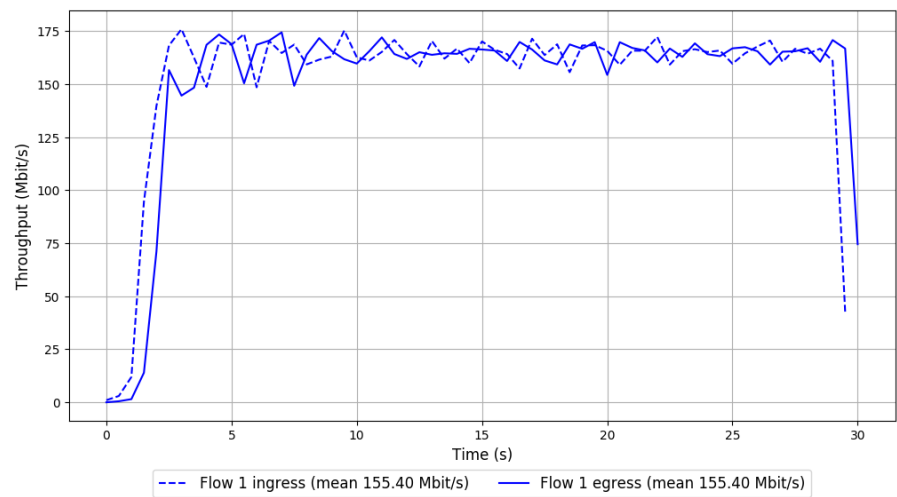


Run 2: Statistics of Indigo

Start at: 2018-08-28 04:54:53
End at: 2018-08-28 04:55:23
Local clock offset: -2.925 ms
Remote clock offset: -0.104 ms

Below is generated by plot.py at 2018-08-28 05:16:18
Datalink statistics
-- Total of 1 flow:
Average throughput: 155.40 Mbit/s
95th percentile per-packet one-way delay: 113.296 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 155.40 Mbit/s
95th percentile per-packet one-way delay: 113.296 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link

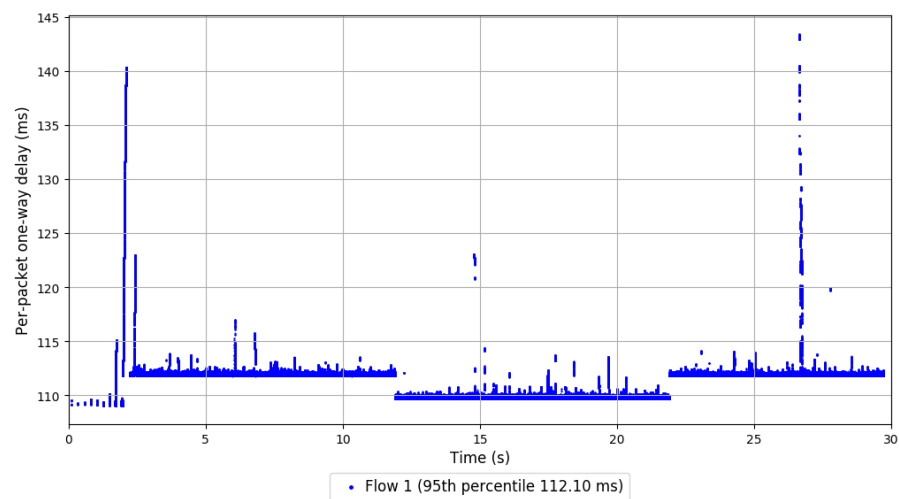
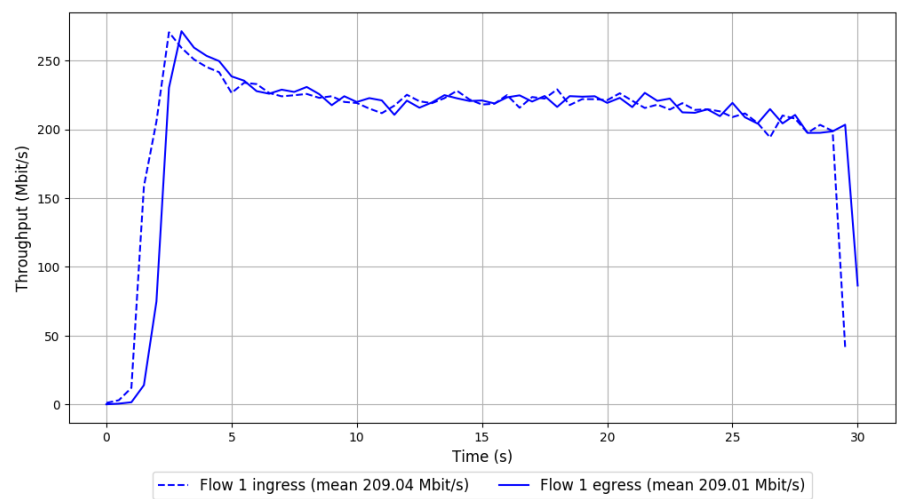


Run 3: Statistics of Indigo

Start at: 2018-08-28 05:01:04
End at: 2018-08-28 05:01:34
Local clock offset: 0.047 ms
Remote clock offset: -0.176 ms

Below is generated by plot.py at 2018-08-28 05:16:43
Datalink statistics
-- Total of 1 flow:
Average throughput: 209.01 Mbit/s
95th percentile per-packet one-way delay: 112.096 ms
Loss rate: 0.01%
-- Flow 1:
Average throughput: 209.01 Mbit/s
95th percentile per-packet one-way delay: 112.096 ms
Loss rate: 0.01%

Run 3: Report of Indigo — Data Link

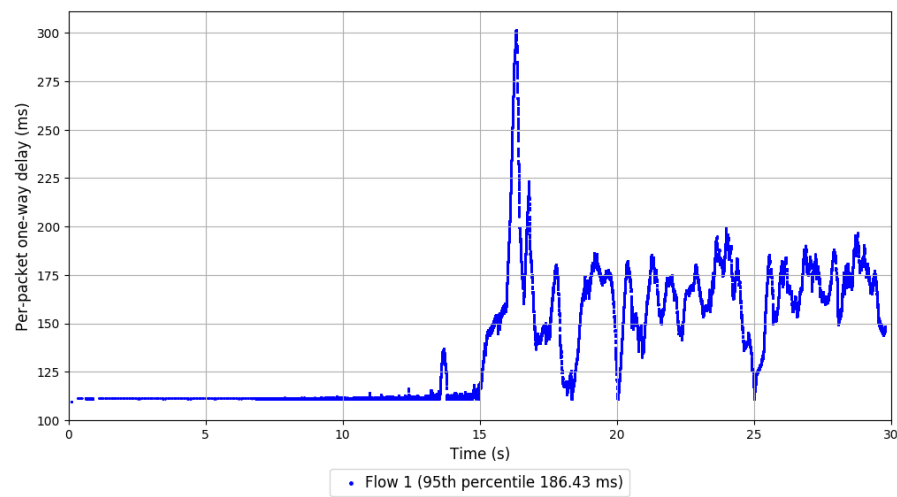
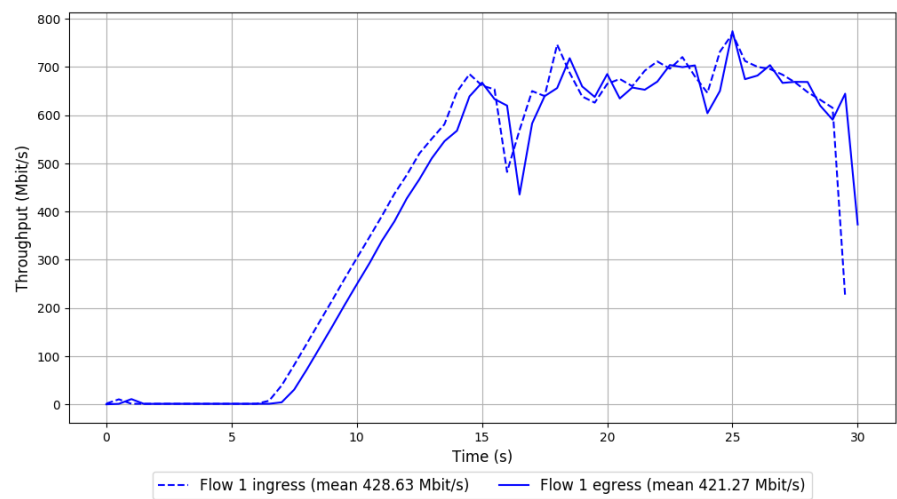


Run 1: Statistics of Muses

Start at: 2018-08-28 04:47:16
End at: 2018-08-28 04:47:46
Local clock offset: -0.113 ms
Remote clock offset: -0.425 ms

Below is generated by plot.py at 2018-08-28 05:17:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 421.27 Mbit/s
95th percentile per-packet one-way delay: 186.427 ms
Loss rate: 1.71%
-- Flow 1:
Average throughput: 421.27 Mbit/s
95th percentile per-packet one-way delay: 186.427 ms
Loss rate: 1.71%

Run 1: Report of Muses — Data Link

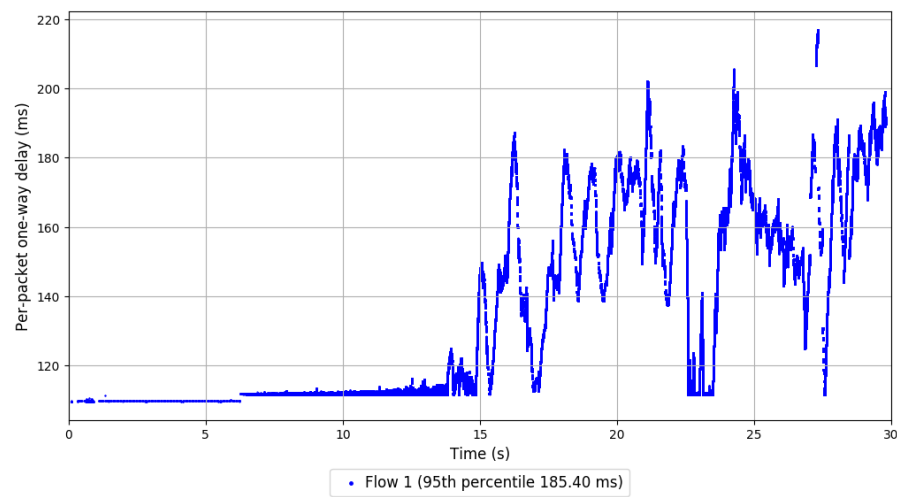
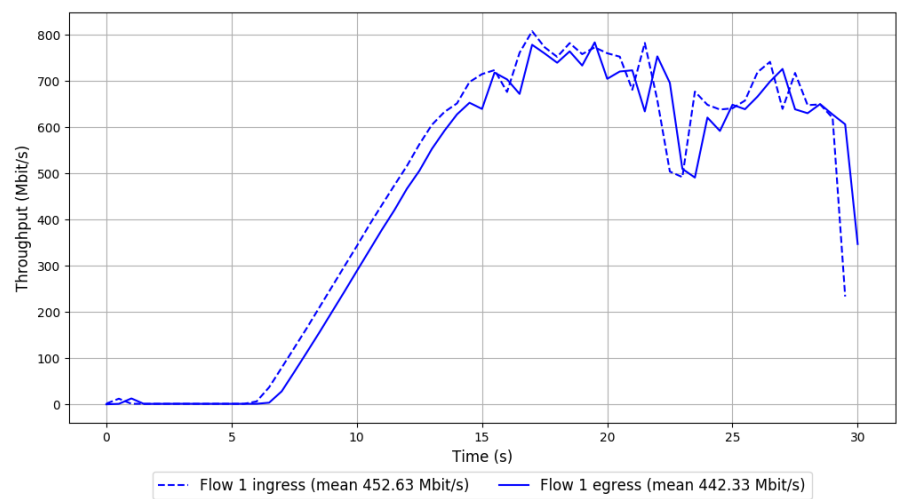


Run 2: Statistics of Muses

Start at: 2018-08-28 04:53:20
End at: 2018-08-28 04:53:50
Local clock offset: 0.107 ms
Remote clock offset: -0.172 ms

Below is generated by plot.py at 2018-08-28 05:18:23
Datalink statistics
-- Total of 1 flow:
Average throughput: 442.33 Mbit/s
95th percentile per-packet one-way delay: 185.400 ms
Loss rate: 2.27%
-- Flow 1:
Average throughput: 442.33 Mbit/s
95th percentile per-packet one-way delay: 185.400 ms
Loss rate: 2.27%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 04:59:31
End at: 2018-08-28 05:00:01
Local clock offset: 2.83 ms
Remote clock offset: -0.096 ms

Below is generated by plot.py at 2018-08-28 05:18:25
Datalink statistics
-- Total of 1 flow:
Average throughput: 433.11 Mbit/s
95th percentile per-packet one-way delay: 184.689 ms
Loss rate: 2.23%
-- Flow 1:
Average throughput: 433.11 Mbit/s
95th percentile per-packet one-way delay: 184.689 ms
Loss rate: 2.23%

Run 3: Report of Muses — Data Link

