

Pantheon Report

Generated at 2018-08-28 12:17:13 (UTC).

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

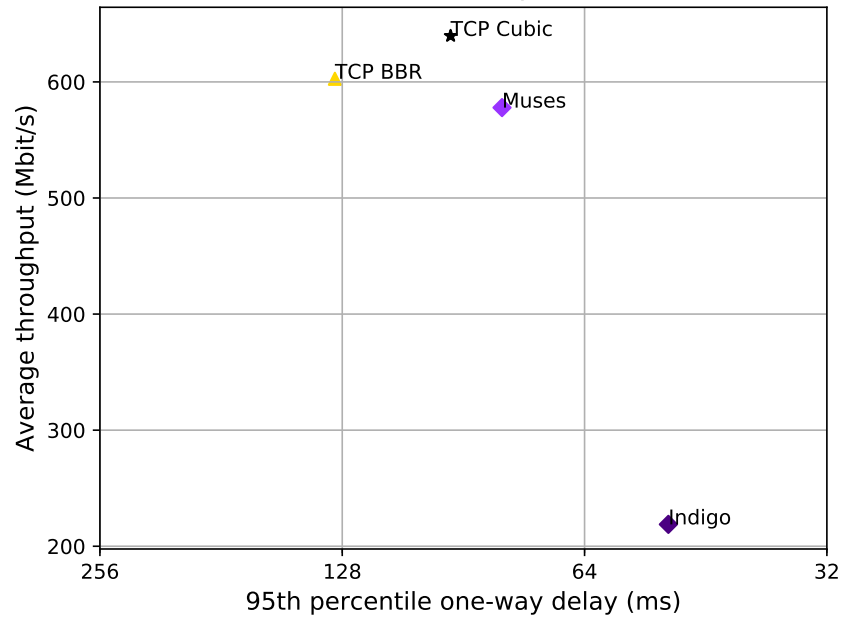
System info:

```
Linux 4.15.0-1017-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
```

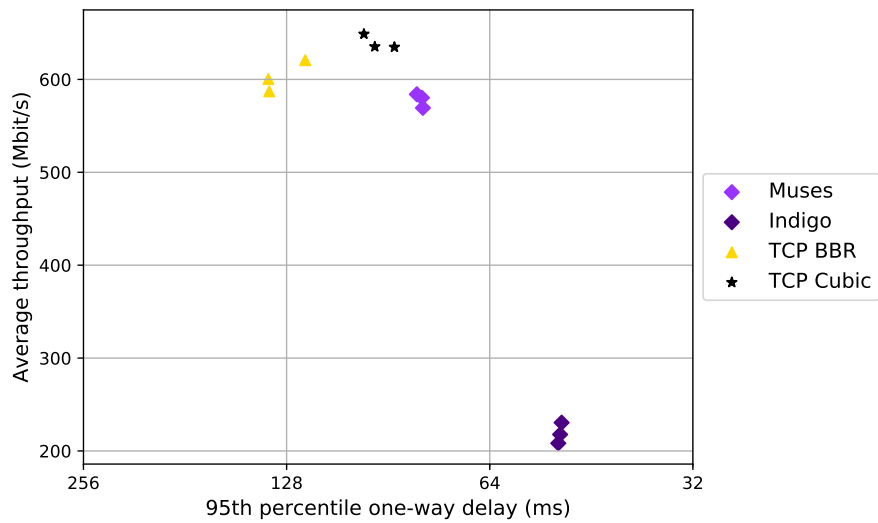
Git summary:

```
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 @ cbfce6db5ff5740dfe1771f813cd646339e1952
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 Iowa to GCE London, 3 runs of 30s each per scheme
(mean of all runs by scheme)



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



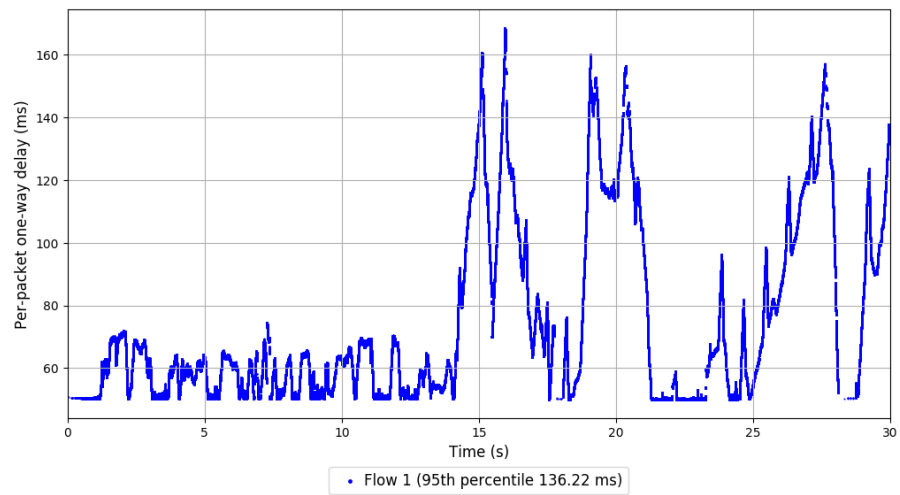
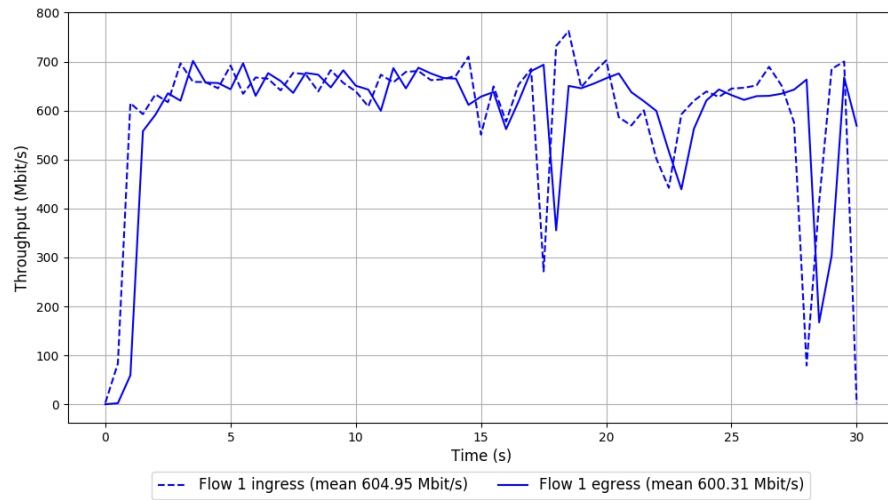
scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	3	602.70	130.71	0.84
TCP Cubic	3	639.62	93.88	0.47
Indigo	3	218.85	50.36	0.35
Muses	3	577.87	81.04	0.58

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 11:44:38
End at: 2018-08-28 11:45:08
Local clock offset: -0.207 ms
Remote clock offset: -0.343 ms

Below is generated by plot.py at 2018-08-28 12:12:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 600.31 Mbit/s
95th percentile per-packet one-way delay: 136.216 ms
Loss rate: 1.10%
-- Flow 1:
Average throughput: 600.31 Mbit/s
95th percentile per-packet one-way delay: 136.216 ms
Loss rate: 1.10%

Run 1: Report of TCP BBR — Data Link

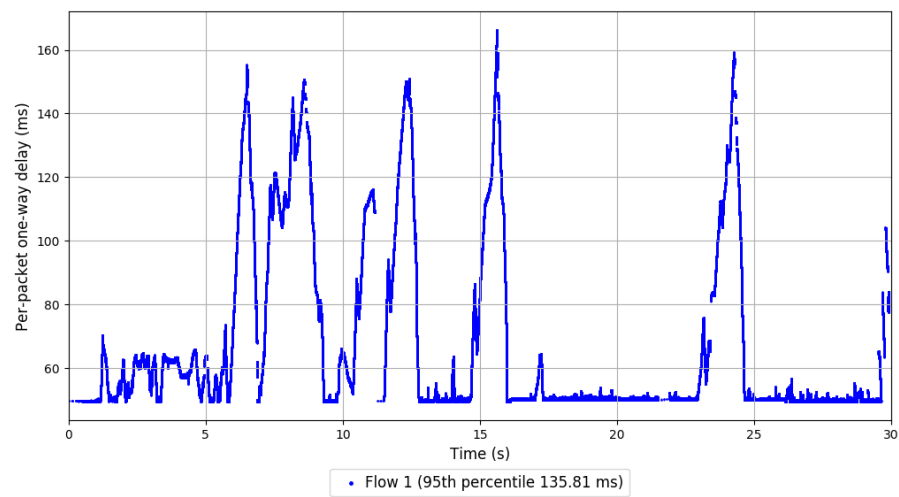
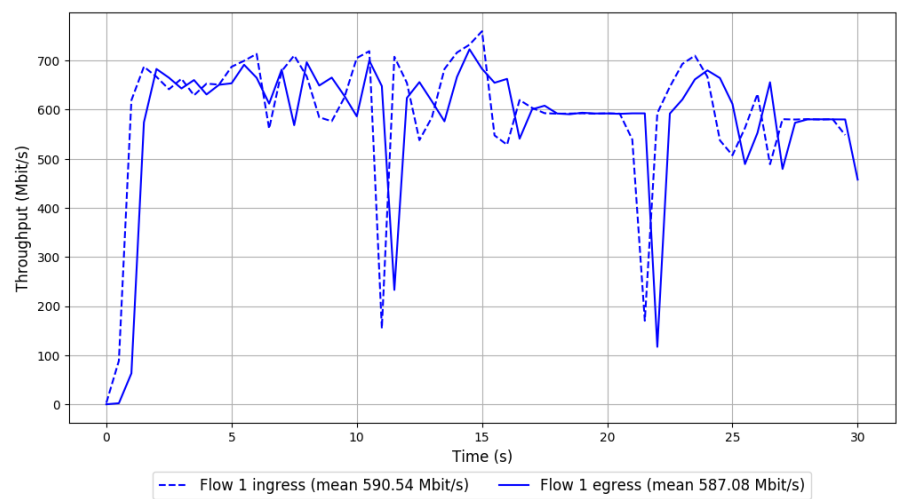


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 11:50:46
End at: 2018-08-28 11:51:16
Local clock offset: -0.691 ms
Remote clock offset: -0.159 ms

Below is generated by plot.py at 2018-08-28 12:12:44
Datalink statistics
-- Total of 1 flow:
Average throughput: 587.08 Mbit/s
95th percentile per-packet one-way delay: 135.809 ms
Loss rate: 0.92%
-- Flow 1:
Average throughput: 587.08 Mbit/s
95th percentile per-packet one-way delay: 135.809 ms
Loss rate: 0.92%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 11:56:54

End at: 2018-08-28 11:57:24

Local clock offset: 0.177 ms

Remote clock offset: -0.063 ms

Below is generated by plot.py at 2018-08-28 12:12:57

Datalink statistics

-- Total of 1 flow:

Average throughput: 620.72 Mbit/s

95th percentile per-packet one-way delay: 120.116 ms

Loss rate: 0.49%

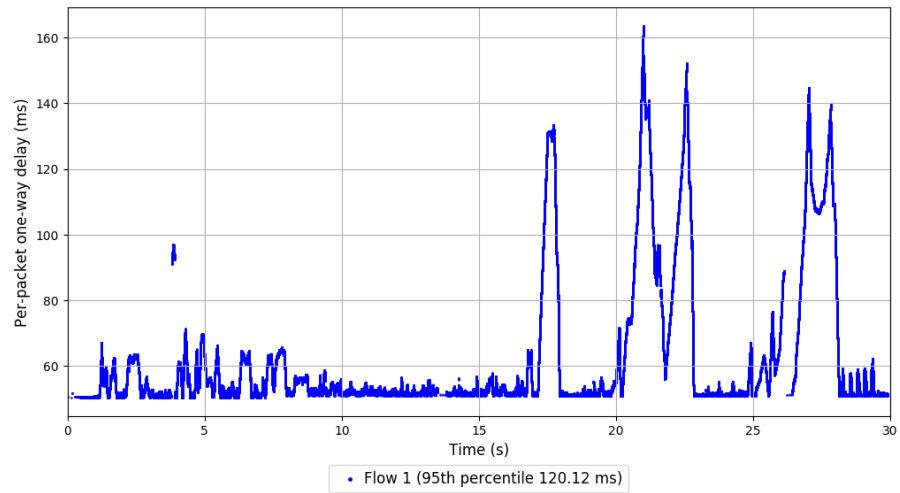
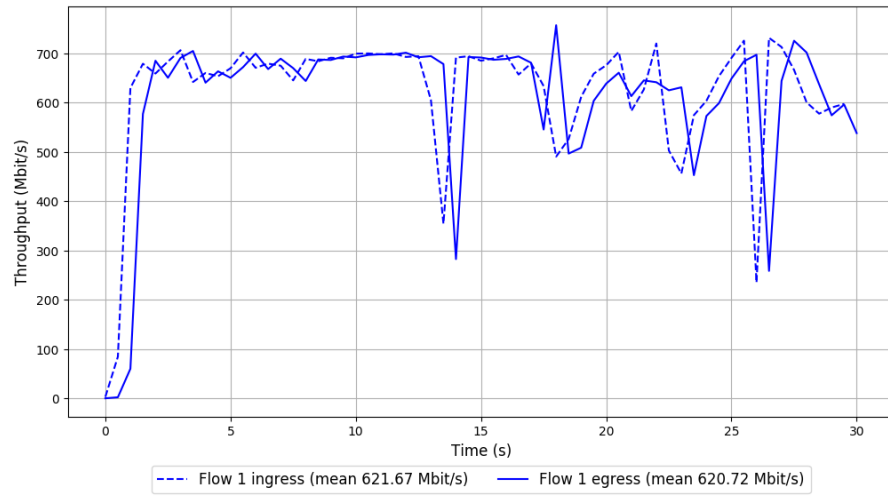
-- Flow 1:

Average throughput: 620.72 Mbit/s

95th percentile per-packet one-way delay: 120.116 ms

Loss rate: 0.49%

Run 3: Report of TCP BBR — Data Link

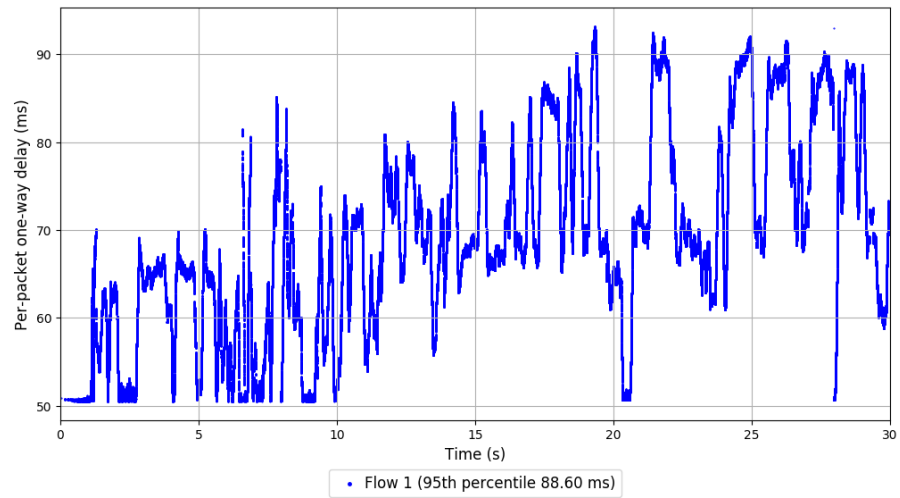
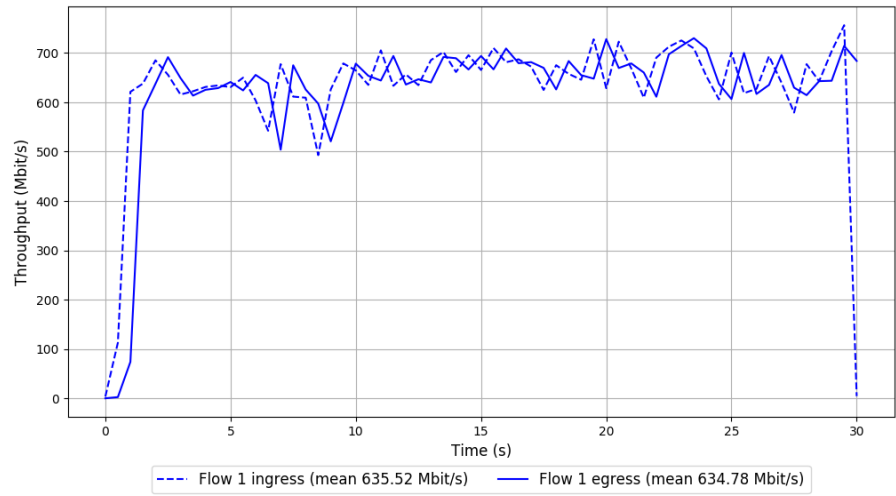


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 11:43:03
End at: 2018-08-28 11:43:33
Local clock offset: -0.12 ms
Remote clock offset: -0.408 ms

Below is generated by plot.py at 2018-08-28 12:13:09
Datalink statistics
-- Total of 1 flow:
Average throughput: 634.78 Mbit/s
95th percentile per-packet one-way delay: 88.597 ms
Loss rate: 0.45%
-- Flow 1:
Average throughput: 634.78 Mbit/s
95th percentile per-packet one-way delay: 88.597 ms
Loss rate: 0.45%

Run 1: Report of TCP Cubic — Data Link

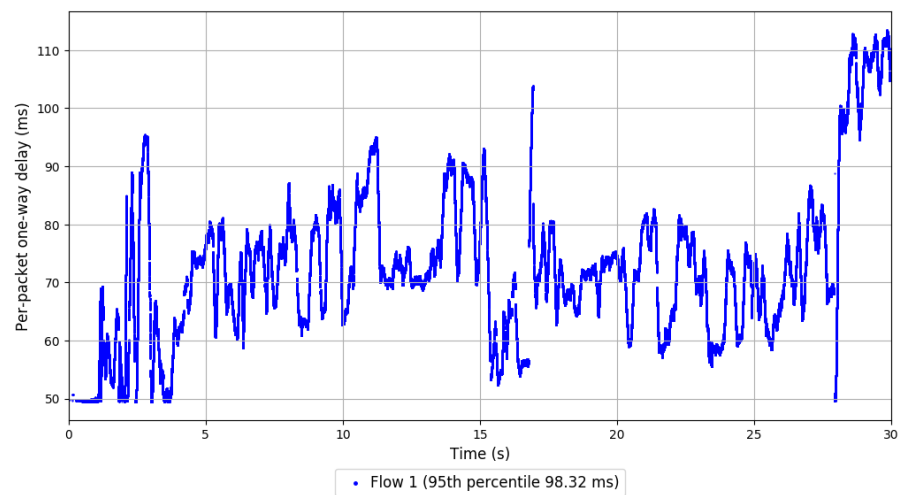
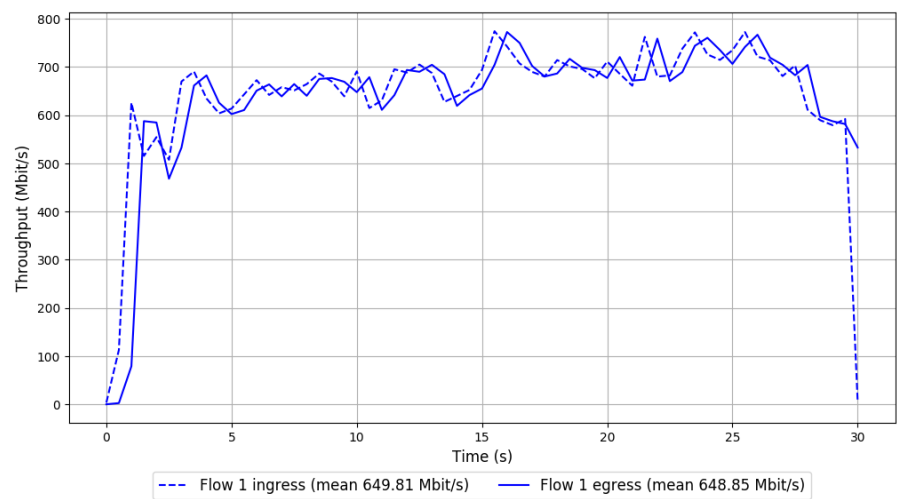


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 11:49:10
End at: 2018-08-28 11:49:40
Local clock offset: -0.659 ms
Remote clock offset: -0.196 ms

Below is generated by plot.py at 2018-08-28 12:13:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 648.85 Mbit/s
95th percentile per-packet one-way delay: 98.320 ms
Loss rate: 0.48%
-- Flow 1:
Average throughput: 648.85 Mbit/s
95th percentile per-packet one-way delay: 98.320 ms
Loss rate: 0.48%

Run 2: Report of TCP Cubic — Data Link

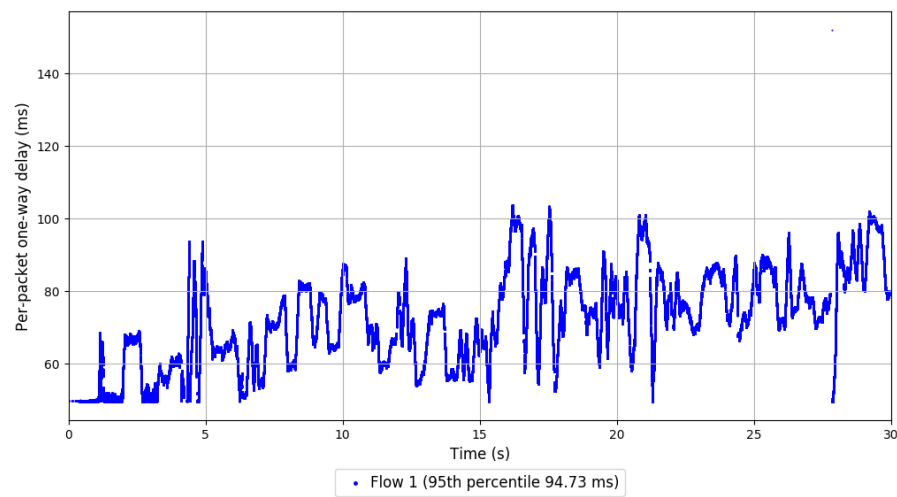
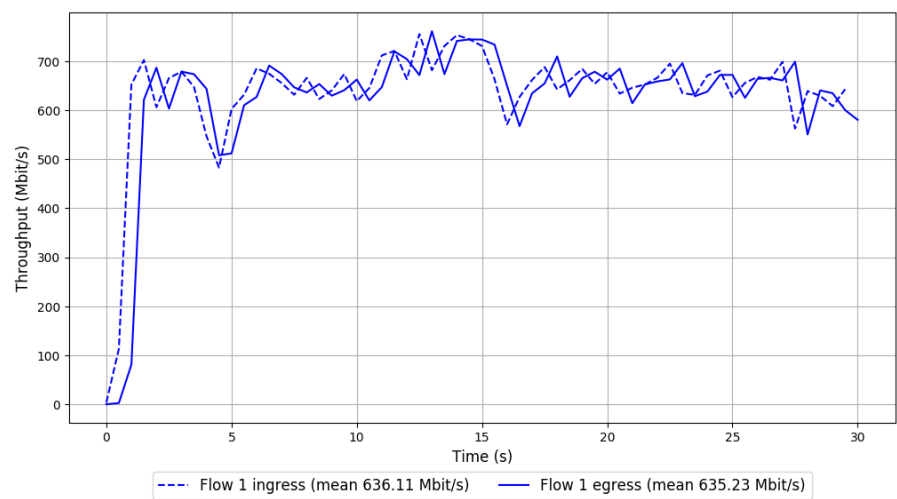


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 11:55:20
End at: 2018-08-28 11:55:50
Local clock offset: -0.631 ms
Remote clock offset: -0.023 ms

Below is generated by plot.py at 2018-08-28 12:13:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 635.23 Mbit/s
95th percentile per-packet one-way delay: 94.733 ms
Loss rate: 0.47%
-- Flow 1:
Average throughput: 635.23 Mbit/s
95th percentile per-packet one-way delay: 94.733 ms
Loss rate: 0.47%

Run 3: Report of TCP Cubic — Data Link

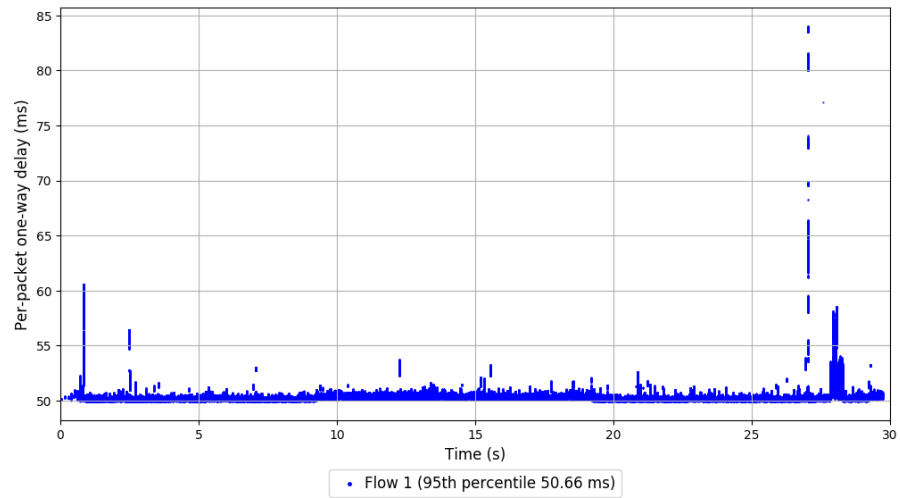
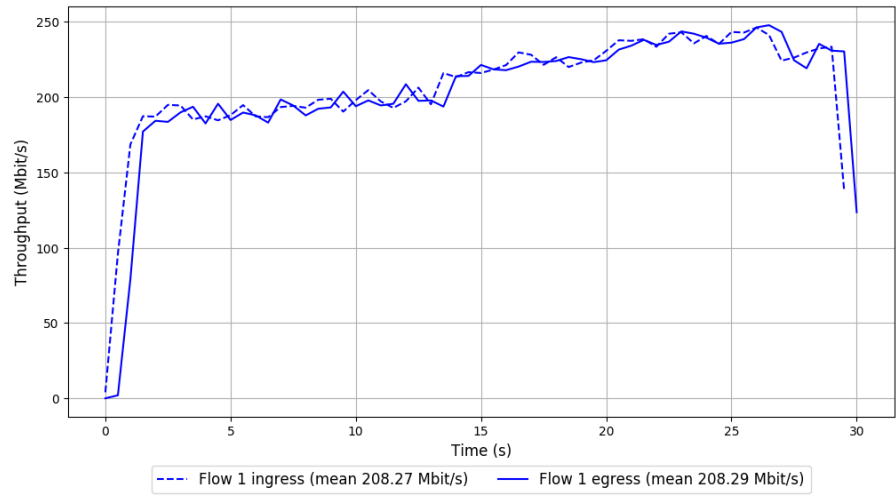


Run 1: Statistics of Indigo

Start at: 2018-08-28 11:46:13
End at: 2018-08-28 11:46:43
Local clock offset: -0.49 ms
Remote clock offset: -0.275 ms

Below is generated by plot.py at 2018-08-28 12:13:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 208.29 Mbit/s
95th percentile per-packet one-way delay: 50.657 ms
Loss rate: 0.33%
-- Flow 1:
Average throughput: 208.29 Mbit/s
95th percentile per-packet one-way delay: 50.657 ms
Loss rate: 0.33%

Run 1: Report of Indigo — Data Link

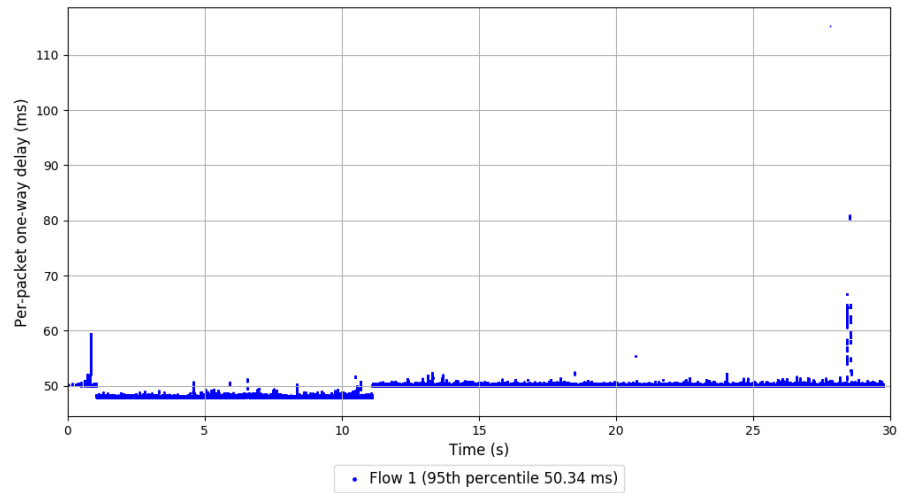
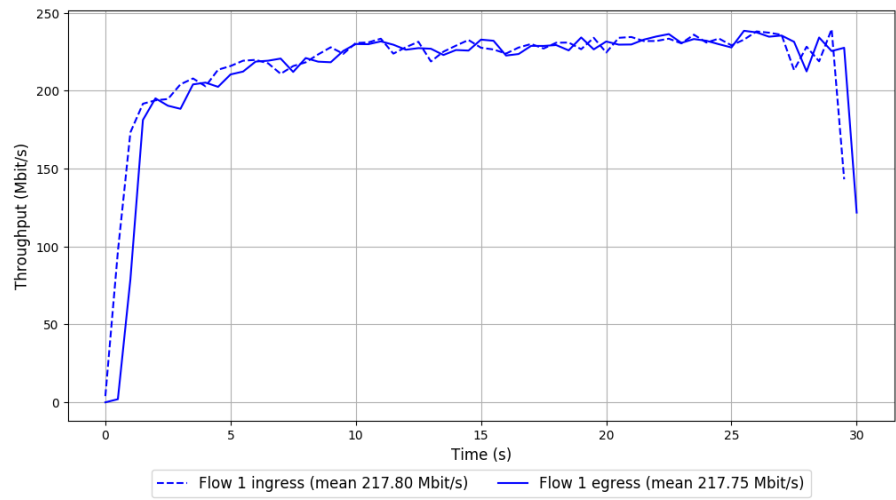


Run 2: Statistics of Indigo

Start at: 2018-08-28 11:52:21
End at: 2018-08-28 11:52:51
Local clock offset: -0.935 ms
Remote clock offset: -0.144 ms

Below is generated by plot.py at 2018-08-28 12:13:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 217.75 Mbit/s
95th percentile per-packet one-way delay: 50.341 ms
Loss rate: 0.37%
-- Flow 1:
Average throughput: 217.75 Mbit/s
95th percentile per-packet one-way delay: 50.341 ms
Loss rate: 0.37%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-08-28 11:58:29

End at: 2018-08-28 11:58:59

Local clock offset: -0.713 ms

Remote clock offset: -0.01 ms

Below is generated by plot.py at 2018-08-28 12:14:25

Datalink statistics

-- Total of 1 flow:

Average throughput: 230.50 Mbit/s

95th percentile per-packet one-way delay: 50.081 ms

Loss rate: 0.36%

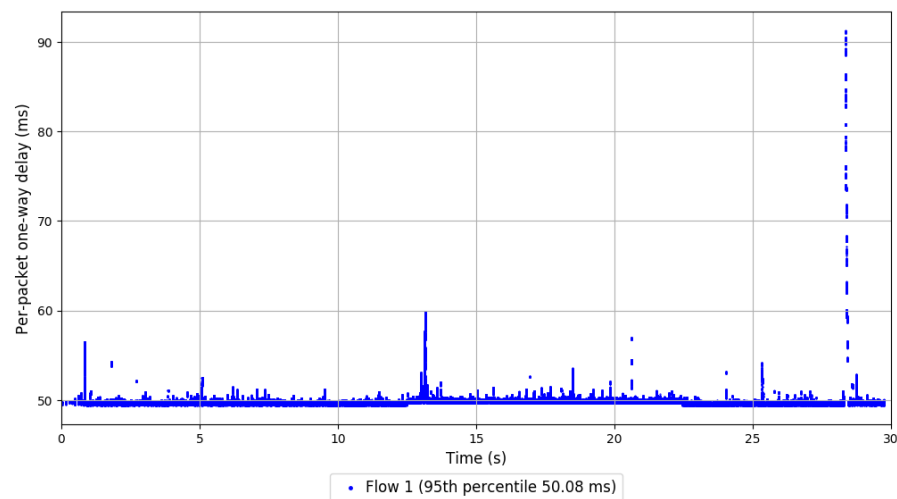
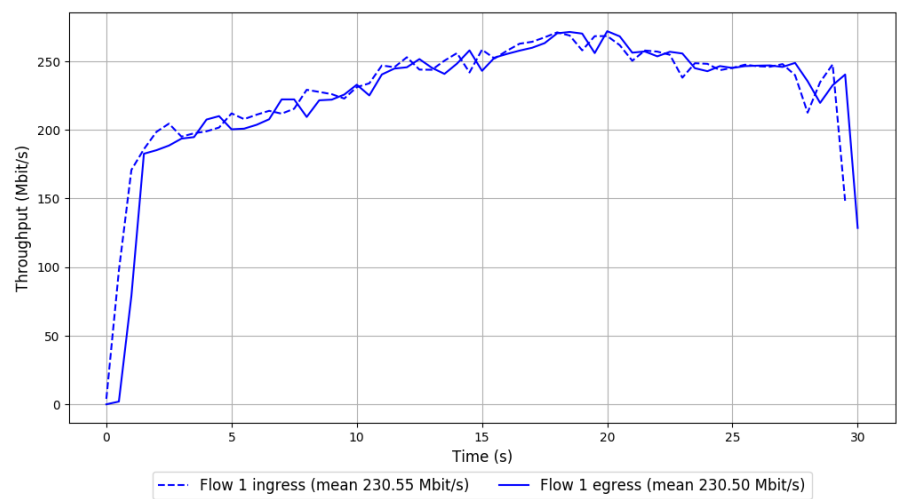
-- Flow 1:

Average throughput: 230.50 Mbit/s

95th percentile per-packet one-way delay: 50.081 ms

Loss rate: 0.36%

Run 3: Report of Indigo — Data Link

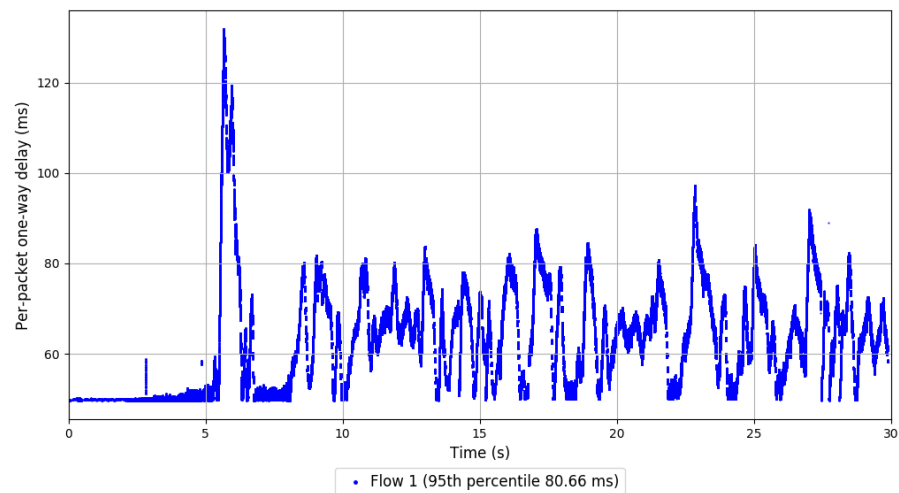
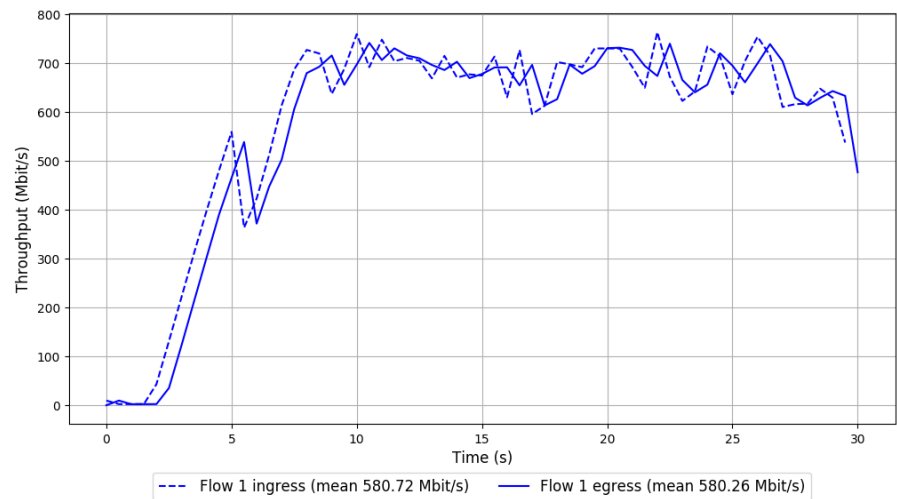


Run 1: Statistics of Muses

Start at: 2018-08-28 11:47:36
End at: 2018-08-28 11:48:06
Local clock offset: -0.535 ms
Remote clock offset: -0.196 ms

Below is generated by plot.py at 2018-08-28 12:16:13
Datalink statistics
-- Total of 1 flow:
Average throughput: 580.26 Mbit/s
95th percentile per-packet one-way delay: 80.656 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 580.26 Mbit/s
95th percentile per-packet one-way delay: 80.656 ms
Loss rate: 0.42%

Run 1: Report of Muses — Data Link

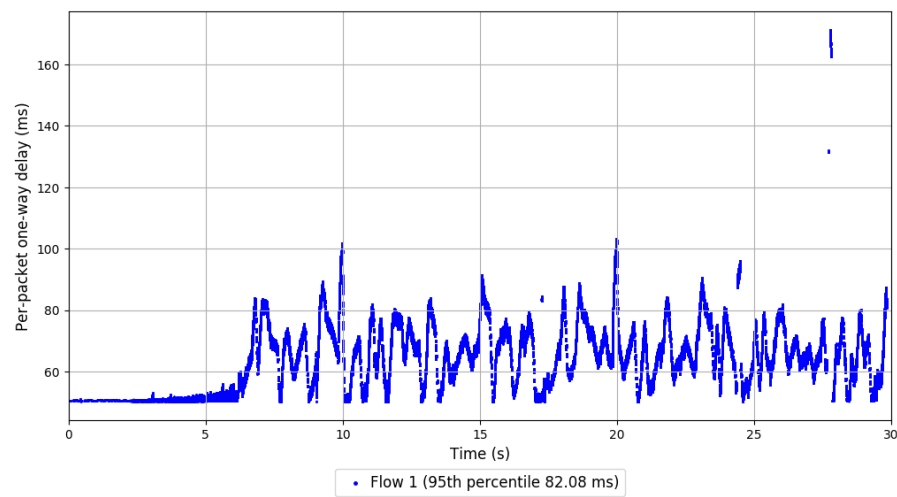
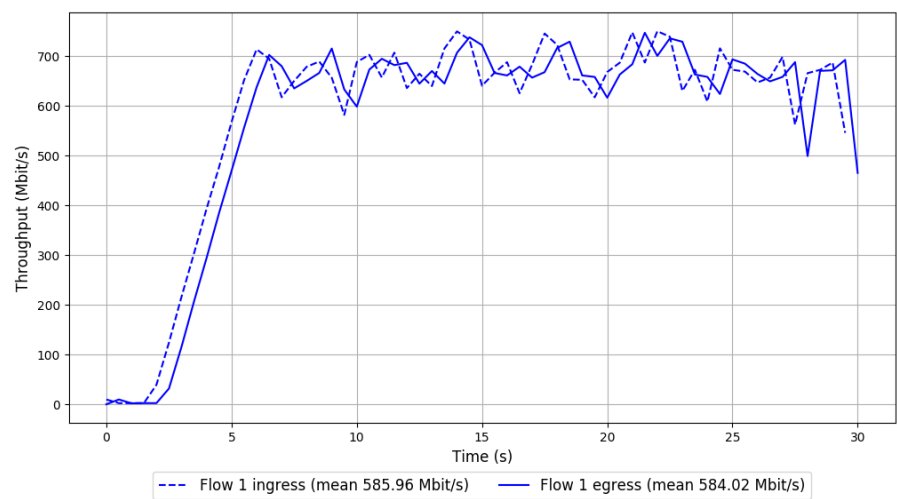


Run 2: Statistics of Muses

Start at: 2018-08-28 11:53:45
End at: 2018-08-28 11:54:15
Local clock offset: -0.498 ms
Remote clock offset: -0.071 ms

Below is generated by plot.py at 2018-08-28 12:17:08
Datalink statistics
-- Total of 1 flow:
Average throughput: 584.02 Mbit/s
95th percentile per-packet one-way delay: 82.079 ms
Loss rate: 0.67%
-- Flow 1:
Average throughput: 584.02 Mbit/s
95th percentile per-packet one-way delay: 82.079 ms
Loss rate: 0.67%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 11:59:54

End at: 2018-08-28 12:00:24

Local clock offset: -0.26 ms

Remote clock offset: 0.053 ms

Below is generated by plot.py at 2018-08-28 12:17:11

Datalink statistics

-- Total of 1 flow:

Average throughput: 569.33 Mbit/s

95th percentile per-packet one-way delay: 80.394 ms

Loss rate: 0.64%

-- Flow 1:

Average throughput: 569.33 Mbit/s

95th percentile per-packet one-way delay: 80.394 ms

Loss rate: 0.64%

Run 3: Report of Muses — Data Link

