

Pantheon Report

Generated at 2018-08-28 08:06:30 (UTC).

Data path: GCE Sydney 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.

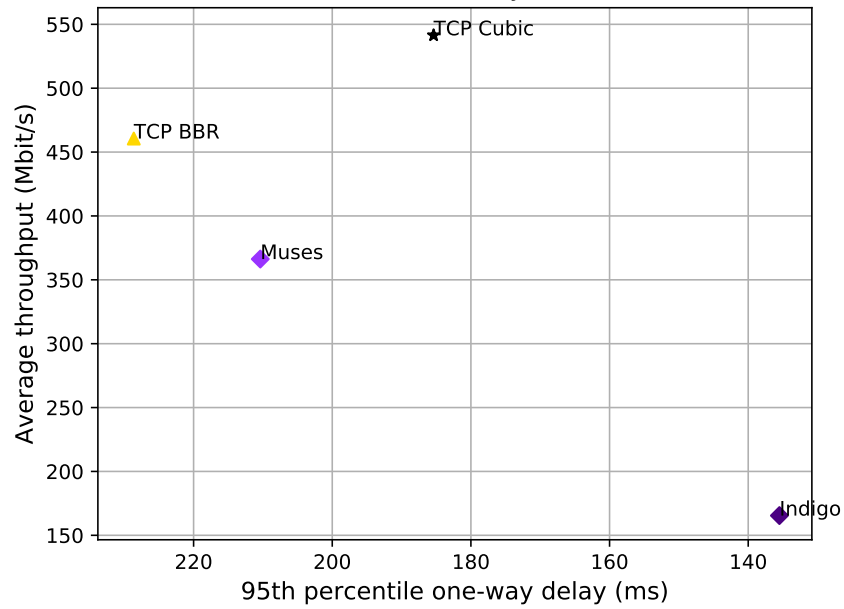
System info:

```
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
```

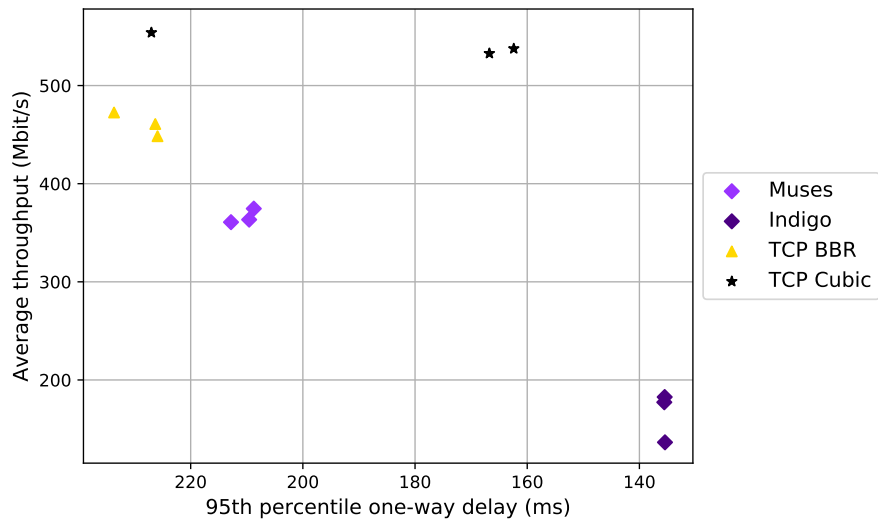
Git summary:

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



test from GCE Sydney 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	460.59	228.63	1.06
TCP Cubic	3	541.41	185.38	0.10
Indigo	3	165.44	135.50	0.00
Muses	3	366.25	210.38	4.44

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 07:37:20

End at: 2018-08-28 07:37:50

Local clock offset: -0.024 ms

Remote clock offset: 0.216 ms

Below is generated by plot.py at 2018-08-28 08:03:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 472.56 Mbit/s

95th percentile per-packet one-way delay: 233.662 ms

Loss rate: 1.98%

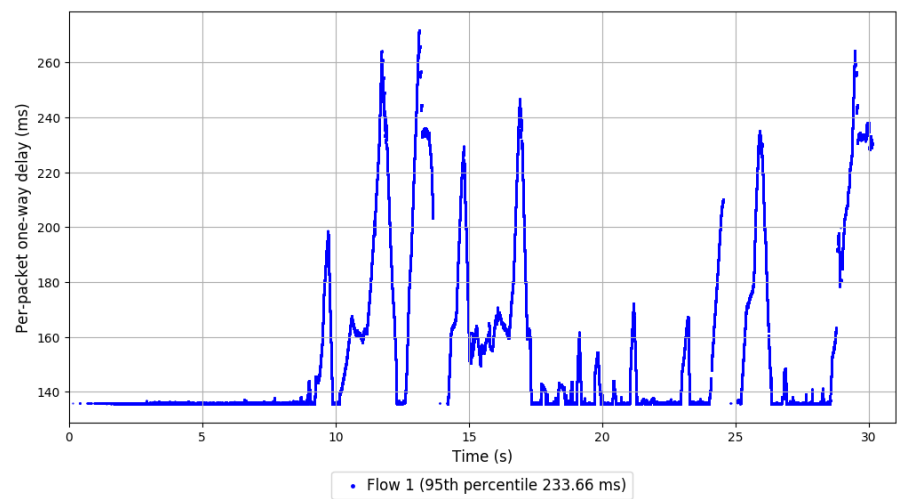
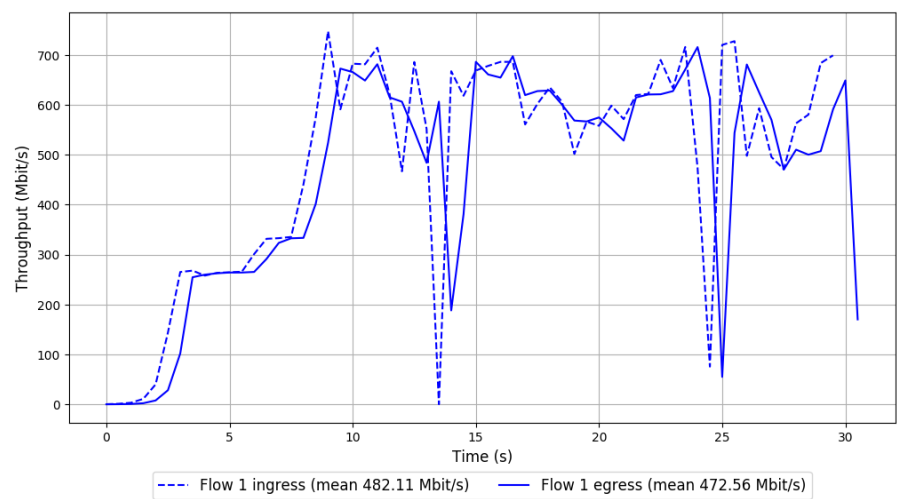
-- Flow 1:

Average throughput: 472.56 Mbit/s

95th percentile per-packet one-way delay: 233.662 ms

Loss rate: 1.98%

Run 1: Report of TCP BBR — Data Link

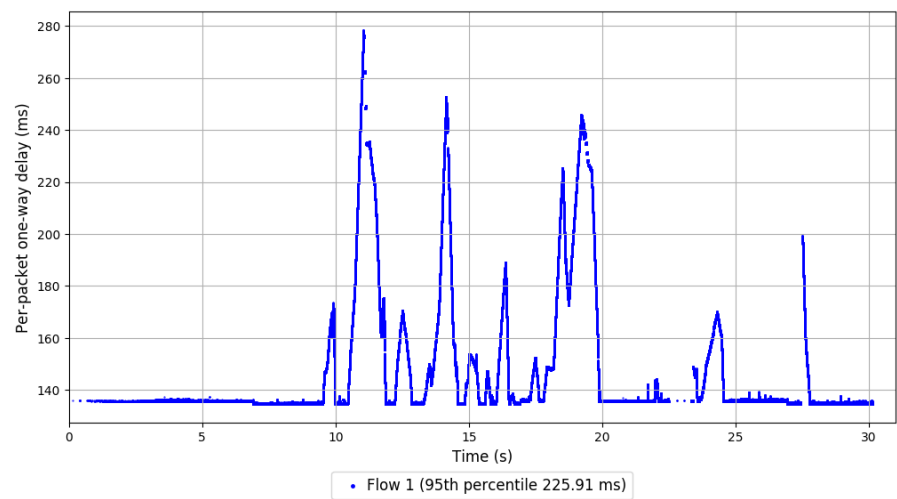
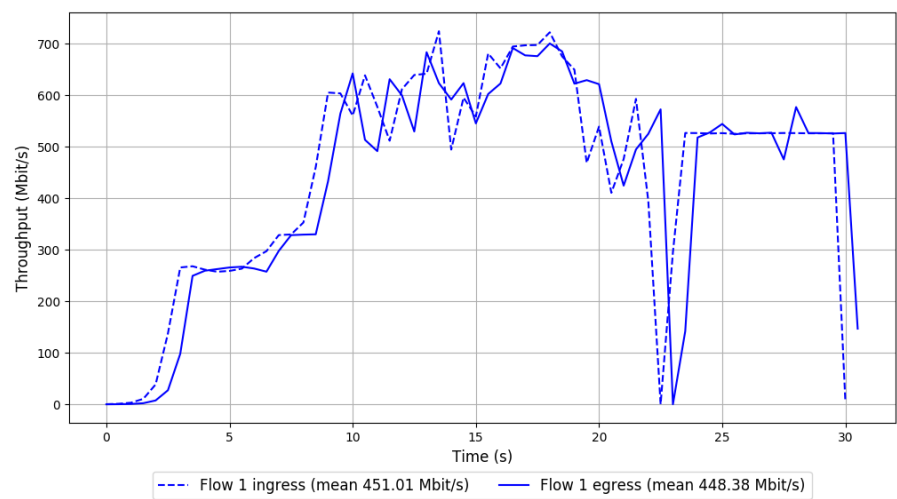


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 07:43:31
End at: 2018-08-28 07:44:01
Local clock offset: 0.003 ms
Remote clock offset: -0.733 ms

Below is generated by plot.py at 2018-08-28 08:03:28
Datalink statistics
-- Total of 1 flow:
Average throughput: 448.38 Mbit/s
95th percentile per-packet one-way delay: 225.910 ms
Loss rate: 0.58%
-- Flow 1:
Average throughput: 448.38 Mbit/s
95th percentile per-packet one-way delay: 225.910 ms
Loss rate: 0.58%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 07:49:46

End at: 2018-08-28 07:50:16

Local clock offset: 0.15 ms

Remote clock offset: 0.283 ms

Below is generated by plot.py at 2018-08-28 08:03:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 460.83 Mbit/s

95th percentile per-packet one-way delay: 226.309 ms

Loss rate: 0.63%

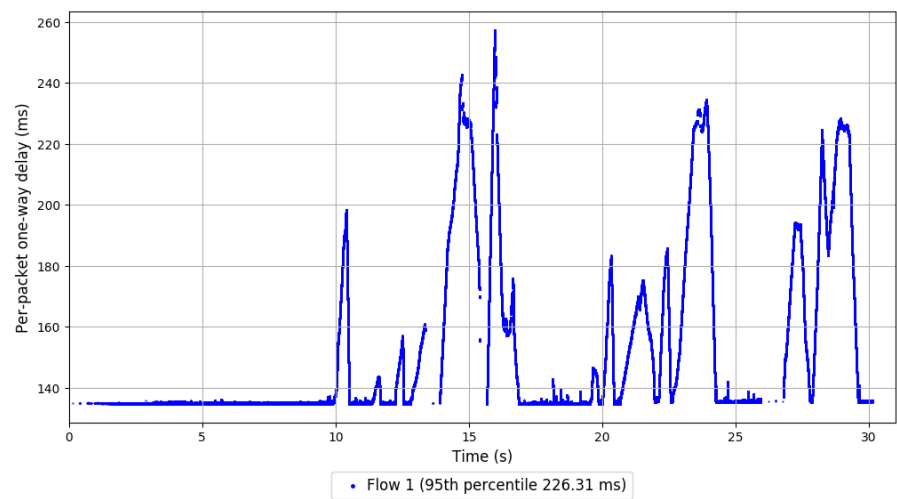
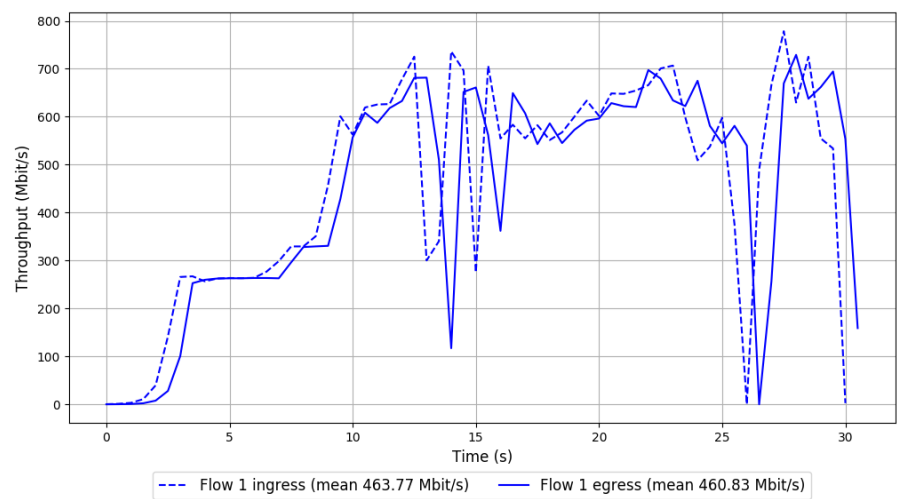
-- Flow 1:

Average throughput: 460.83 Mbit/s

95th percentile per-packet one-way delay: 226.309 ms

Loss rate: 0.63%

Run 3: Report of TCP BBR — Data Link

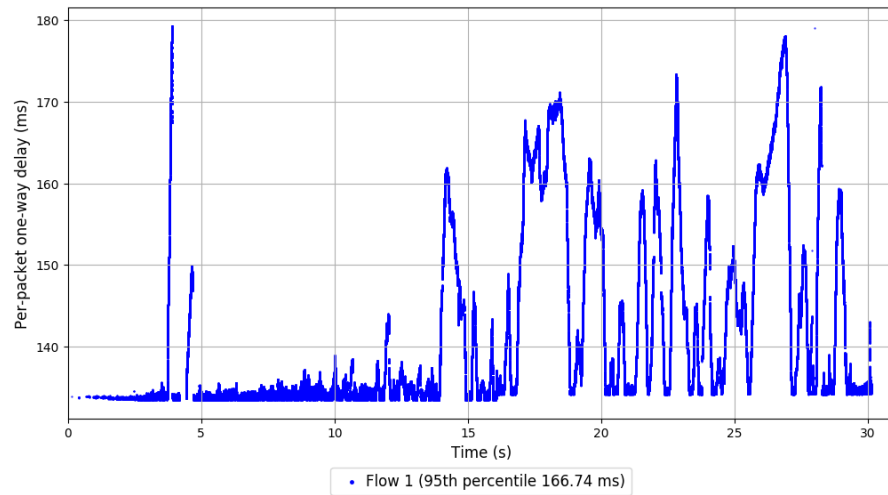
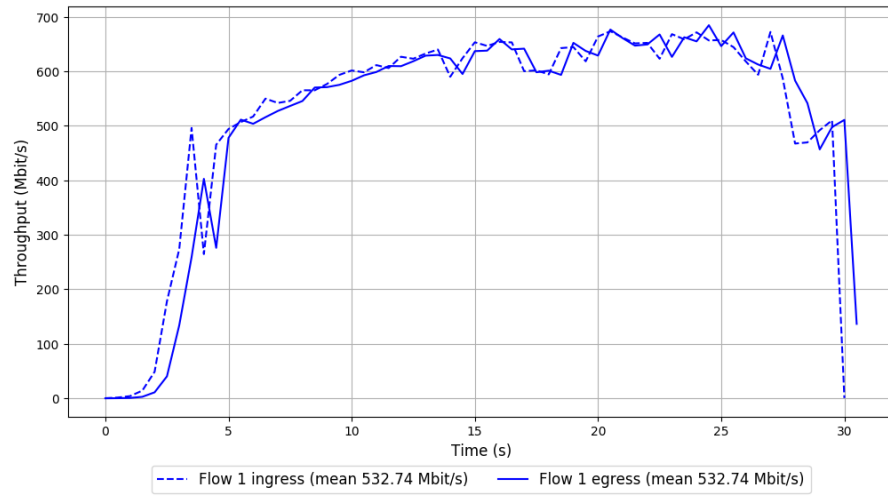


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 07:40:22
End at: 2018-08-28 07:40:52
Local clock offset: -0.019 ms
Remote clock offset: -0.952 ms

Below is generated by plot.py at 2018-08-28 08:04:11
Datalink statistics
-- Total of 1 flow:
Average throughput: 532.74 Mbit/s
95th percentile per-packet one-way delay: 166.744 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 532.74 Mbit/s
95th percentile per-packet one-way delay: 166.744 ms
Loss rate: 0.00%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 07:46:34

End at: 2018-08-28 07:47:04

Local clock offset: 0.193 ms

Remote clock offset: 0.185 ms

Below is generated by plot.py at 2018-08-28 08:04:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 553.94 Mbit/s

95th percentile per-packet one-way delay: 227.002 ms

Loss rate: 0.23%

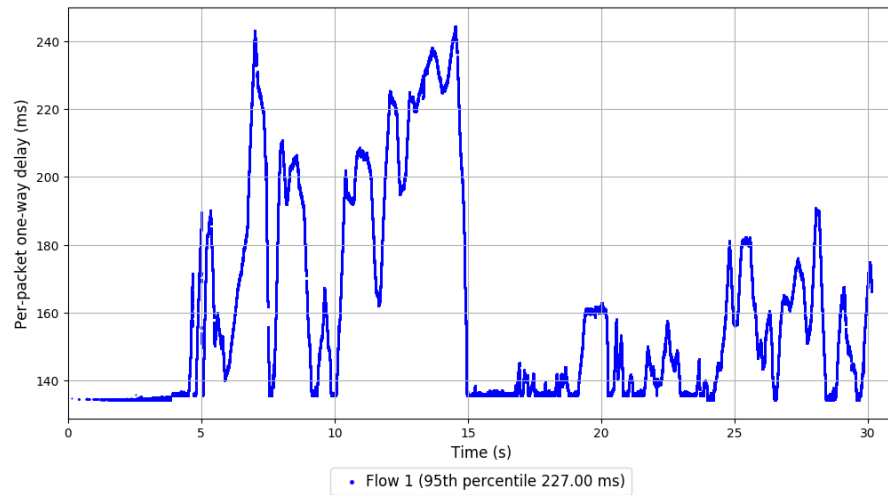
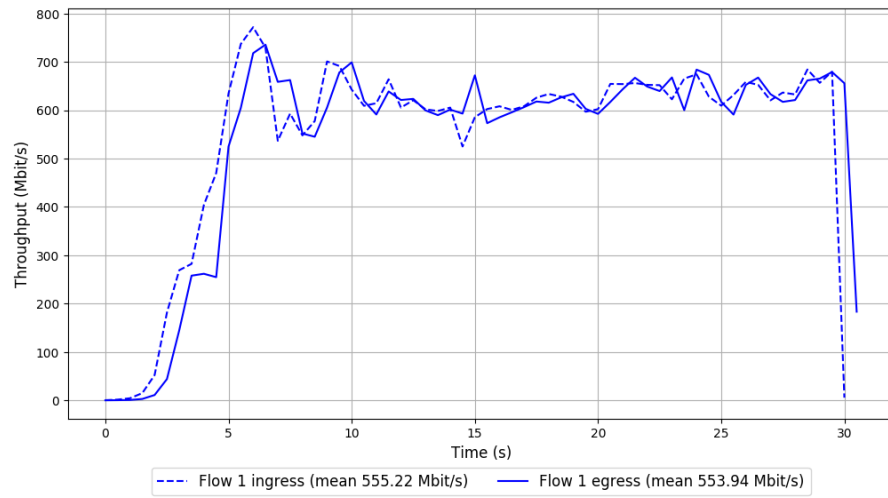
-- Flow 1:

Average throughput: 553.94 Mbit/s

95th percentile per-packet one-way delay: 227.002 ms

Loss rate: 0.23%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 07:52:52

End at: 2018-08-28 07:53:22

Local clock offset: 0.043 ms

Remote clock offset: 0.495 ms

Below is generated by plot.py at 2018-08-28 08:04:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 537.56 Mbit/s

95th percentile per-packet one-way delay: 162.401 ms

Loss rate: 0.06%

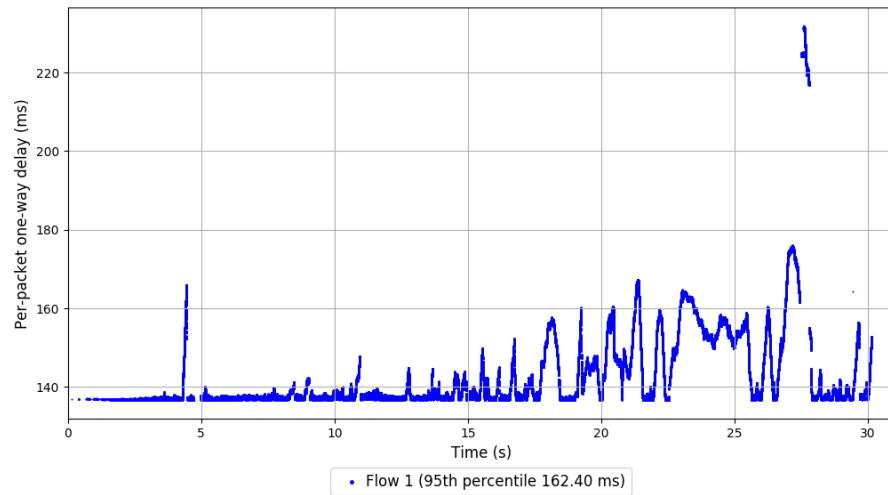
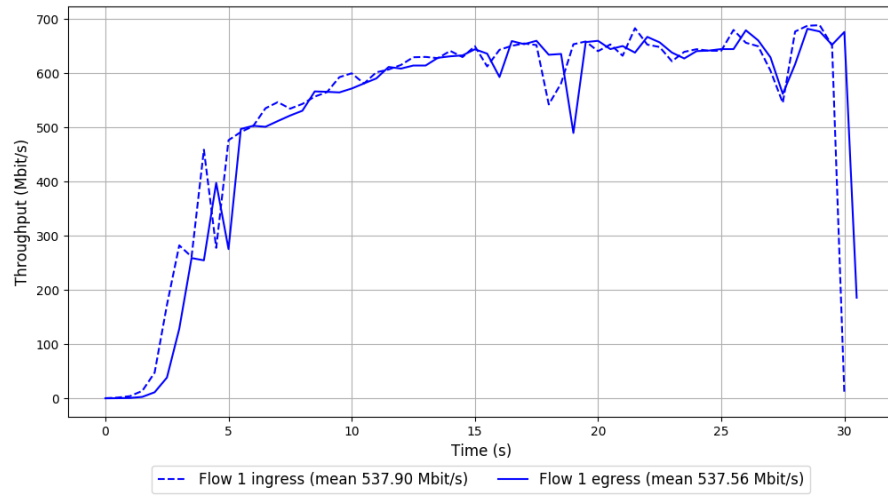
-- Flow 1:

Average throughput: 537.56 Mbit/s

95th percentile per-packet one-way delay: 162.401 ms

Loss rate: 0.06%

Run 3: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-08-28 07:38:59

End at: 2018-08-28 07:39:29

Local clock offset: 0.038 ms

Remote clock offset: -0.88 ms

Below is generated by plot.py at 2018-08-28 08:04:24

Datalink statistics

-- Total of 1 flow:

Average throughput: 136.45 Mbit/s

95th percentile per-packet one-way delay: 135.442 ms

Loss rate: 0.00%

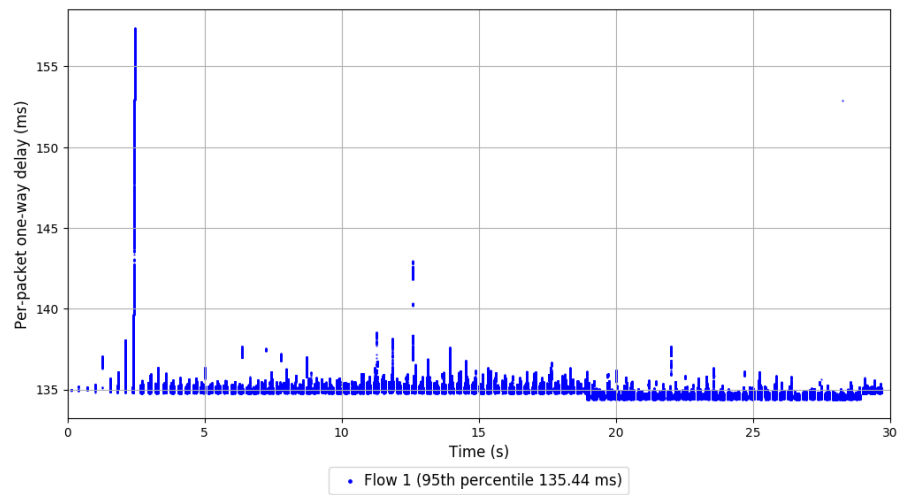
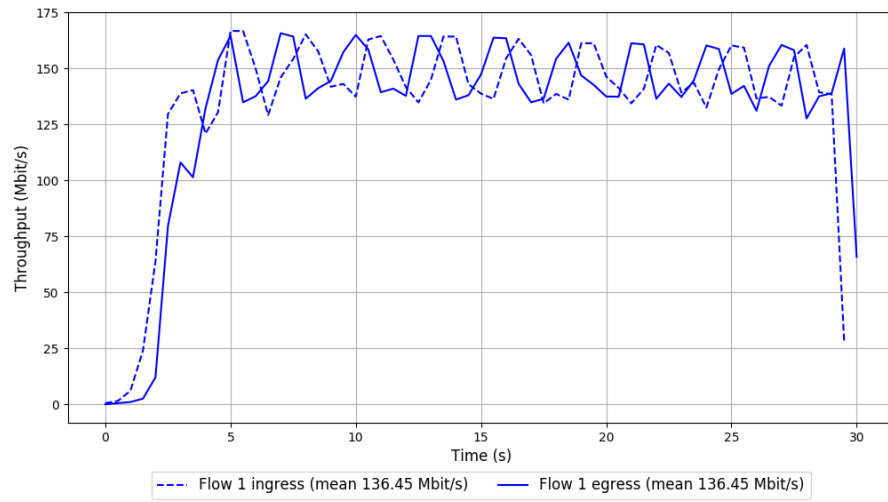
-- Flow 1:

Average throughput: 136.45 Mbit/s

95th percentile per-packet one-way delay: 135.442 ms

Loss rate: 0.00%

Run 1: Report of Indigo — Data Link

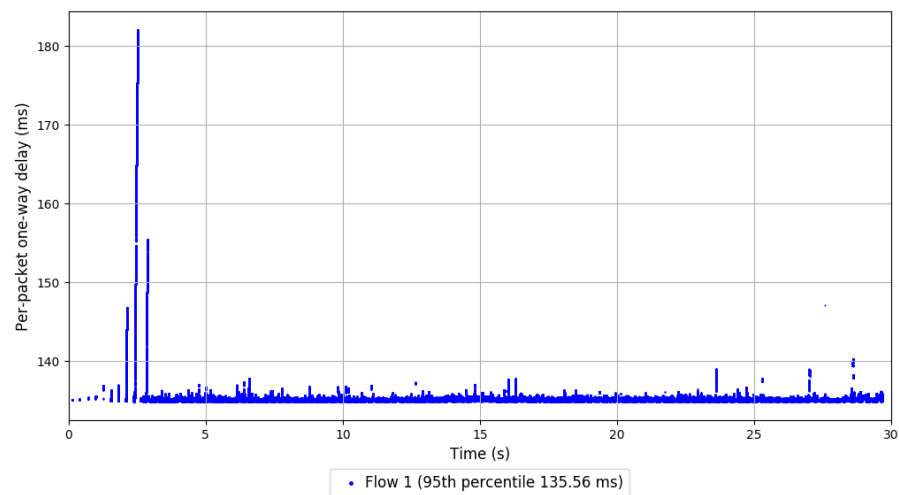
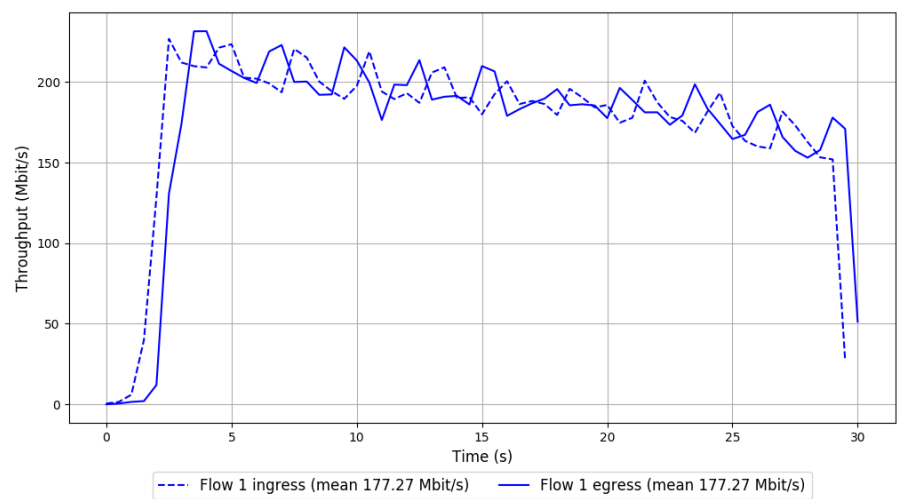


Run 2: Statistics of Indigo

Start at: 2018-08-28 07:45:07
End at: 2018-08-28 07:45:37
Local clock offset: 0.189 ms
Remote clock offset: -0.288 ms

Below is generated by plot.py at 2018-08-28 08:04:24
Datalink statistics
-- Total of 1 flow:
Average throughput: 177.27 Mbit/s
95th percentile per-packet one-way delay: 135.563 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 177.27 Mbit/s
95th percentile per-packet one-way delay: 135.563 ms
Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-08-28 07:51:24

End at: 2018-08-28 07:51:55

Local clock offset: 0.046 ms

Remote clock offset: -0.155 ms

Below is generated by plot.py at 2018-08-28 08:04:38

Datalink statistics

-- Total of 1 flow:

Average throughput: 182.61 Mbit/s

95th percentile per-packet one-way delay: 135.493 ms

Loss rate: 0.00%

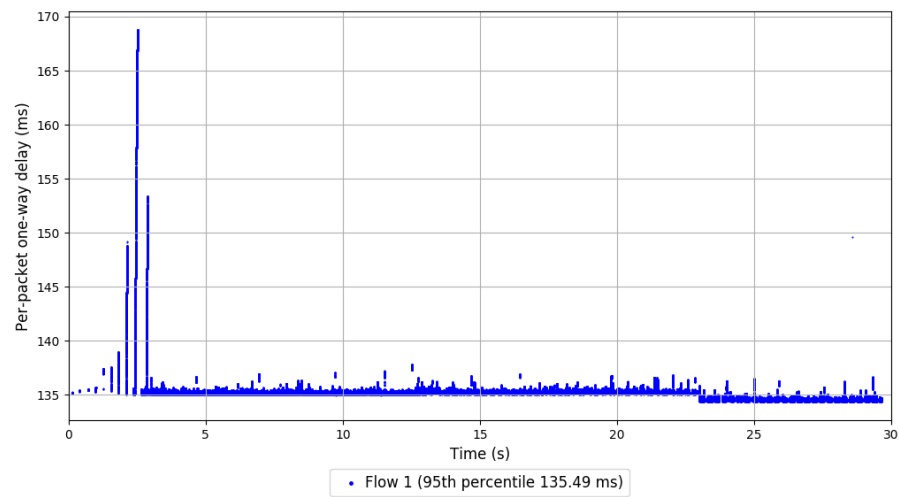
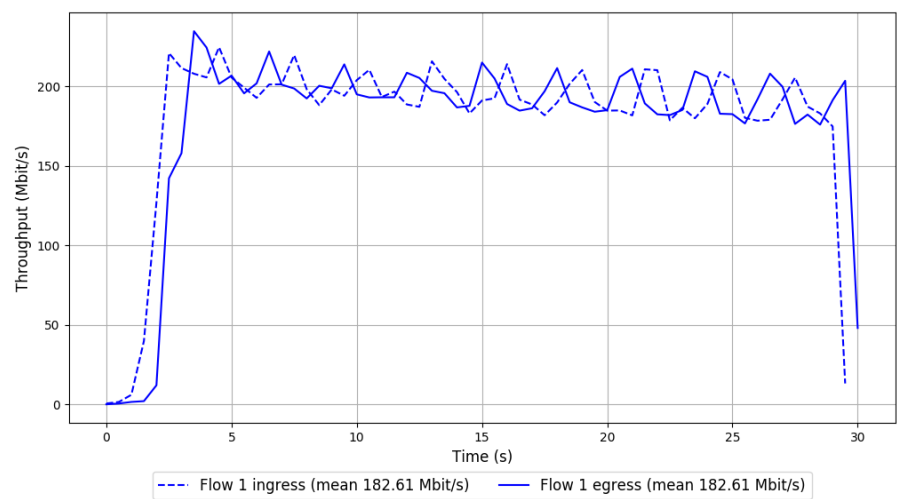
-- Flow 1:

Average throughput: 182.61 Mbit/s

95th percentile per-packet one-way delay: 135.493 ms

Loss rate: 0.00%

Run 3: Report of Indigo — Data Link



Run 1: Statistics of Muses

Start at: 2018-08-28 07:35:39

End at: 2018-08-28 07:36:09

Local clock offset: 0.186 ms

Remote clock offset: 0.012 ms

Below is generated by plot.py at 2018-08-28 08:05:42

Datalink statistics

-- Total of 1 flow:

Average throughput: 360.79 Mbit/s

95th percentile per-packet one-way delay: 212.811 ms

Loss rate: 4.76%

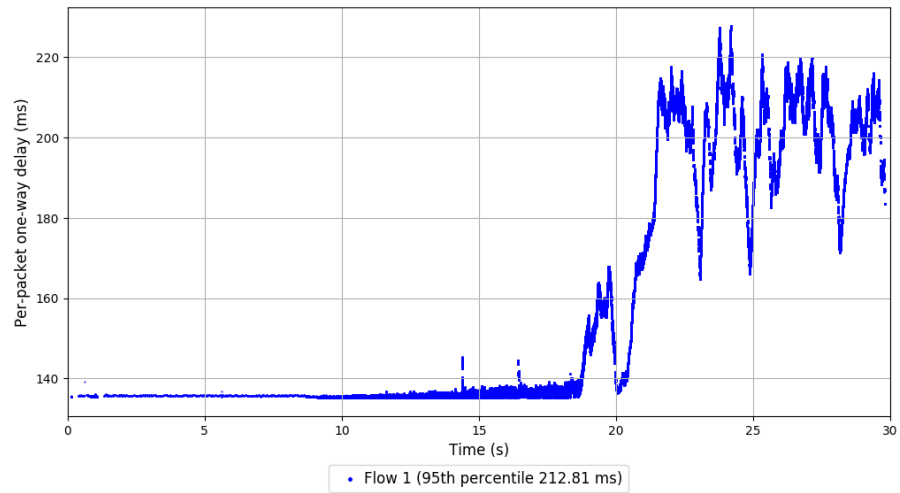
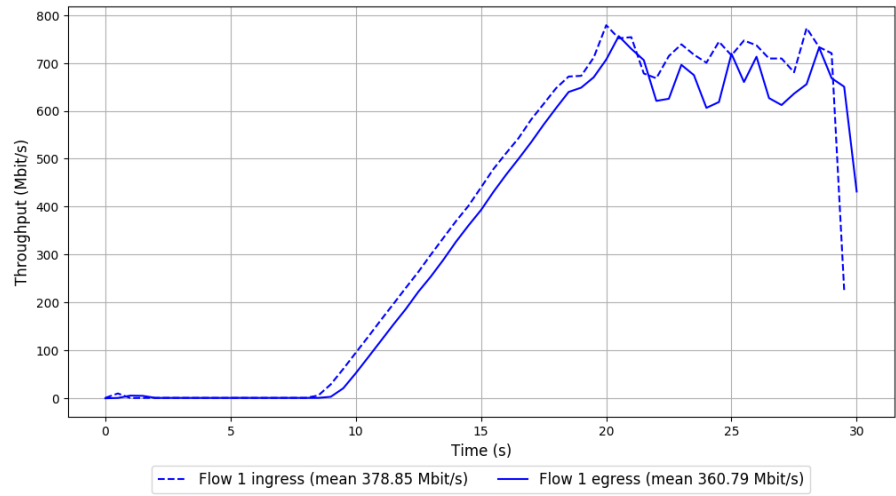
-- Flow 1:

Average throughput: 360.79 Mbit/s

95th percentile per-packet one-way delay: 212.811 ms

Loss rate: 4.76%

Run 1: Report of Muses — Data Link



Run 2: Statistics of Muses

Start at: 2018-08-28 07:42:00

End at: 2018-08-28 07:42:30

Local clock offset: 0.003 ms

Remote clock offset: 0.757 ms

Below is generated by plot.py at 2018-08-28 08:06:27

Datalink statistics

-- Total of 1 flow:

Average throughput: 363.37 Mbit/s

95th percentile per-packet one-way delay: 209.577 ms

Loss rate: 3.24%

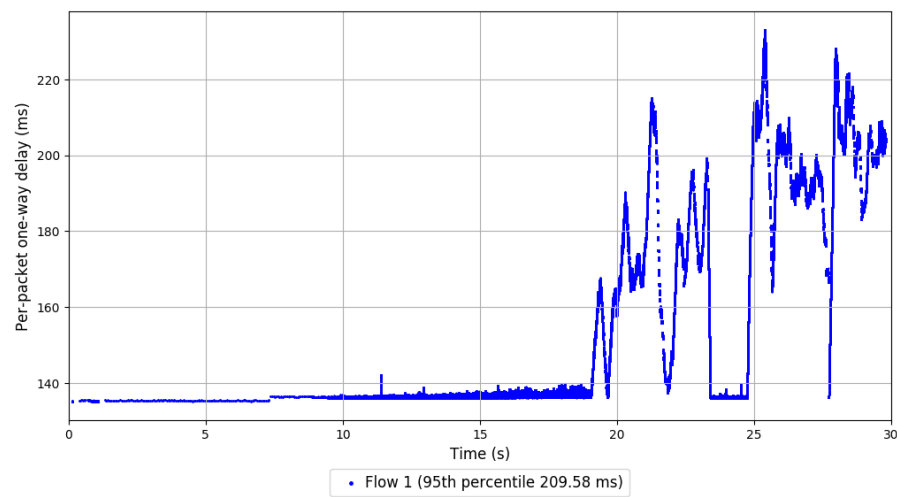
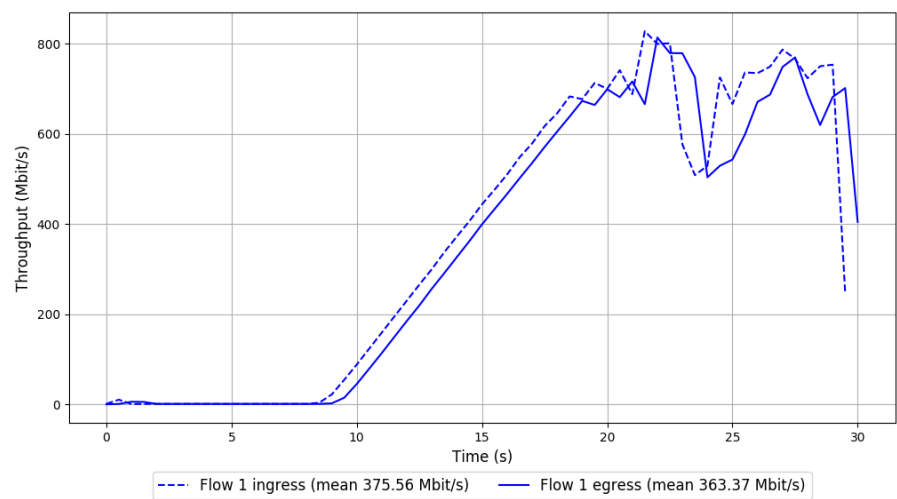
-- Flow 1:

Average throughput: 363.37 Mbit/s

95th percentile per-packet one-way delay: 209.577 ms

Loss rate: 3.24%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 07:48:14
End at: 2018-08-28 07:48:44
Local clock offset: 0.017 ms
Remote clock offset: -0.121 ms

Below is generated by plot.py at 2018-08-28 08:06:29
Datalink statistics
-- Total of 1 flow:
Average throughput: 374.59 Mbit/s
95th percentile per-packet one-way delay: 208.748 ms
Loss rate: 5.32%
-- Flow 1:
Average throughput: 374.59 Mbit/s
95th percentile per-packet one-way delay: 208.748 ms
Loss rate: 5.32%

Run 3: Report of Muses — Data Link

