

Pantheon Report

Generated at 2018-09-03 09:42:41 (UTC).

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

Repeated the test of 4 congestion control schemes twice.

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.

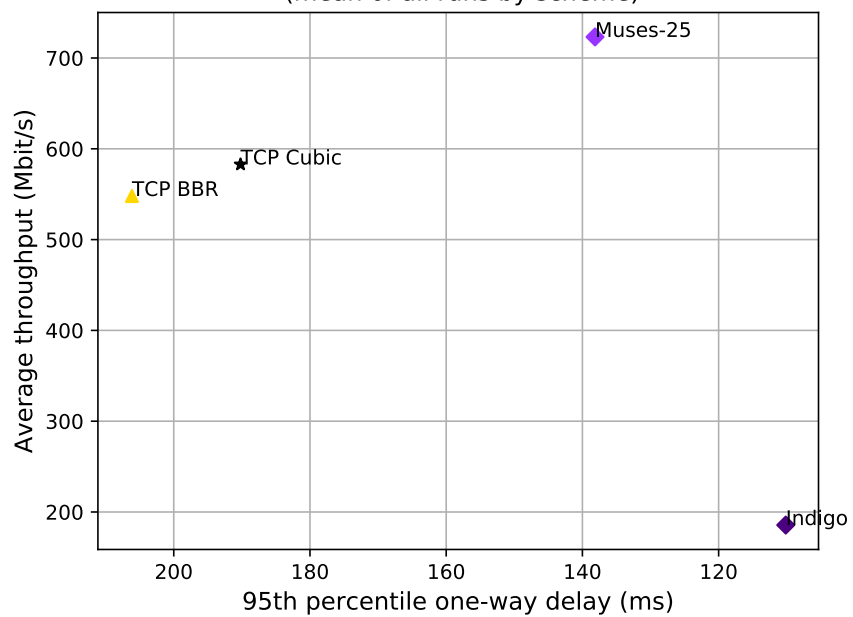
System info:

```
Linux 4.15.0-1018-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
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

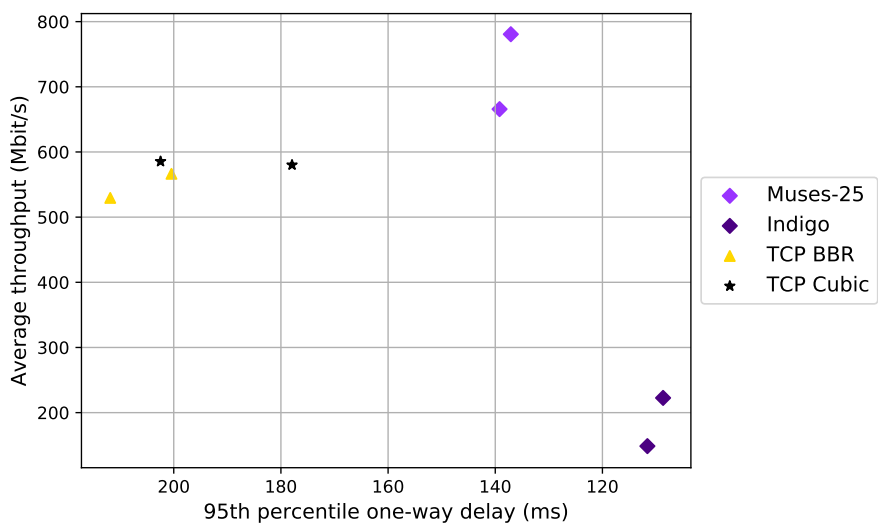
Git summary:

```
branch: muses @ f309f5459e2c5237279a184e52ece7a2b47ef1c9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b8d5019b83a3a678804d830fcfe1da7b3a63421b
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 London to GCE Tokyo, 2 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE London to GCE Tokyo, 2 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	2	548.02	206.14	2.38
TCP Cubic	2	582.76	190.19	1.06
Indigo	2	185.60	110.14	0.92
Muses-25	2	723.21	138.15	0.88

Run 1: Statistics of TCP BBR

Start at: 2018-09-03 09:25:38

End at: 2018-09-03 09:26:08

Local clock offset: 31.335 ms

Remote clock offset: 3.404 ms

Below is generated by plot.py at 2018-09-03 09:42:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 566.51 Mbit/s

95th percentile per-packet one-way delay: 200.427 ms

Loss rate: 2.24%

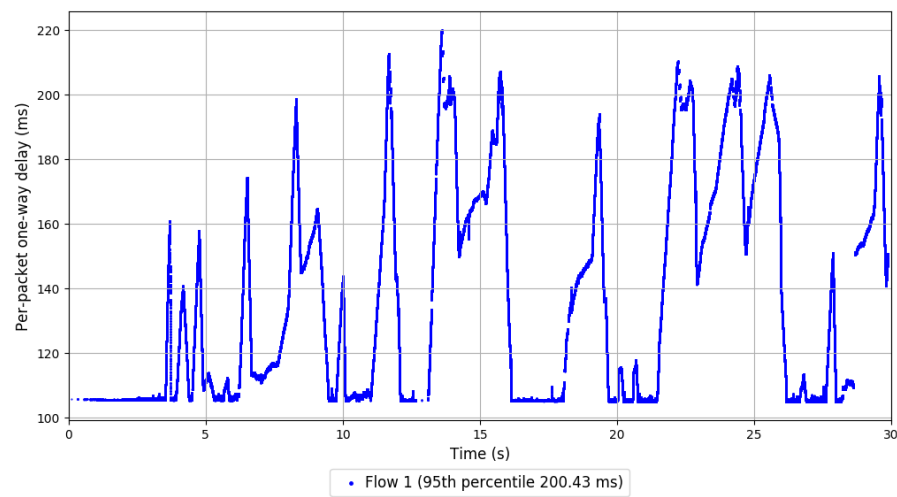
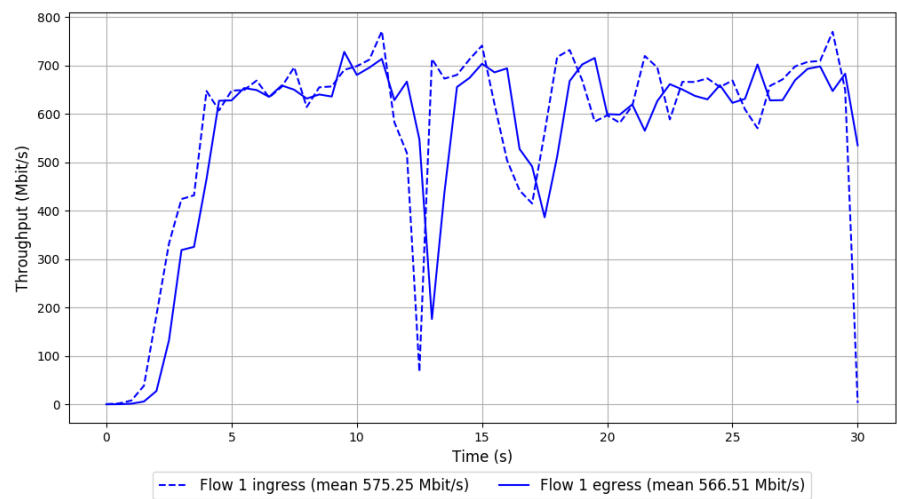
-- Flow 1:

Average throughput: 566.51 Mbit/s

95th percentile per-packet one-way delay: 200.427 ms

Loss rate: 2.24%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-03 09:32:02

End at: 2018-09-03 09:32:32

Local clock offset: 29.425 ms

Remote clock offset: 3.331 ms

Below is generated by plot.py at 2018-09-03 09:42:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 529.54 Mbit/s

95th percentile per-packet one-way delay: 211.851 ms

Loss rate: 2.51%

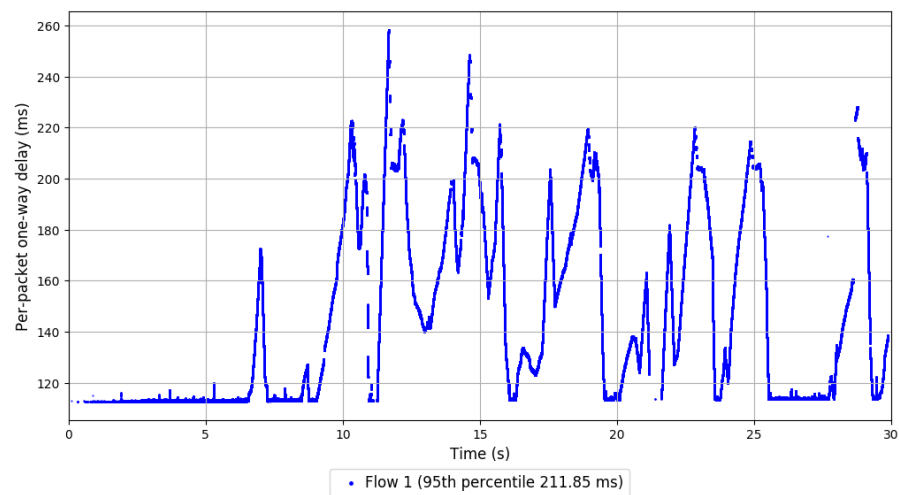
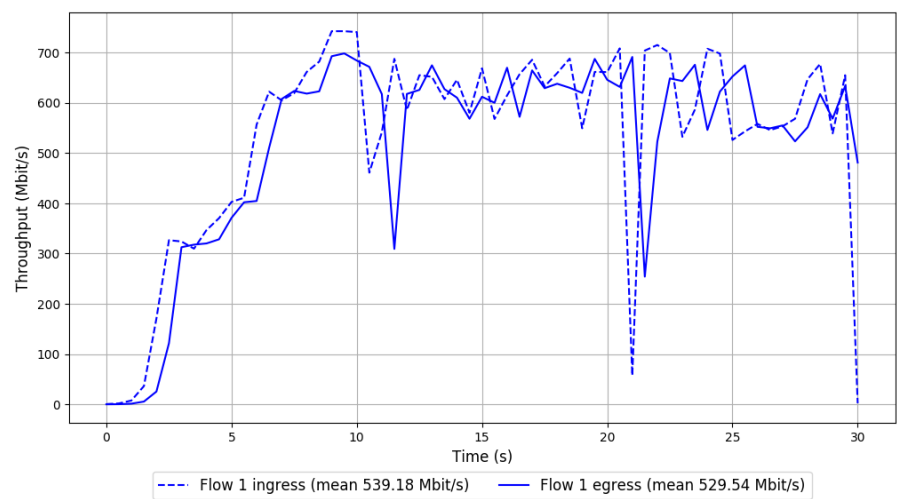
-- Flow 1:

Average throughput: 529.54 Mbit/s

95th percentile per-packet one-way delay: 211.851 ms

Loss rate: 2.51%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-03 09:22:19

End at: 2018-09-03 09:22:49

Local clock offset: 28.141 ms

Remote clock offset: 3.766 ms

Below is generated by plot.py at 2018-09-03 09:42:04

Datalink statistics

-- Total of 1 flow:

Average throughput: 580.11 Mbit/s

95th percentile per-packet one-way delay: 177.926 ms

Loss rate: 1.06%

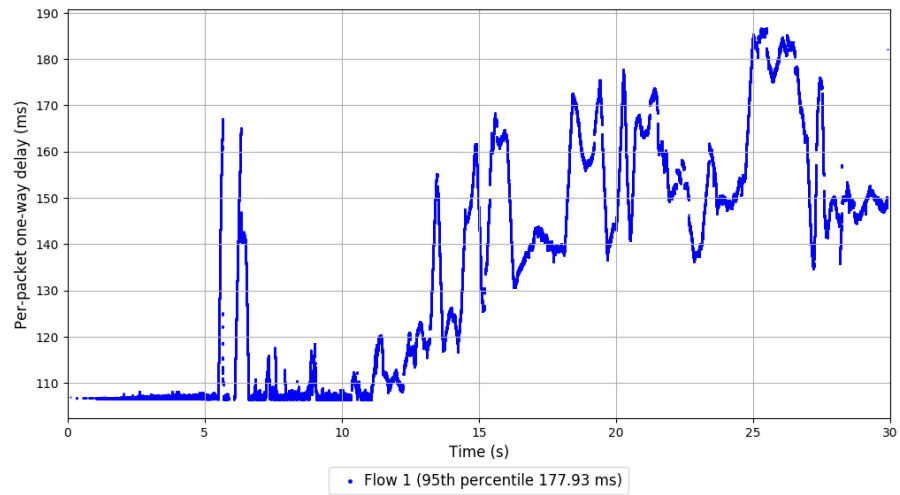
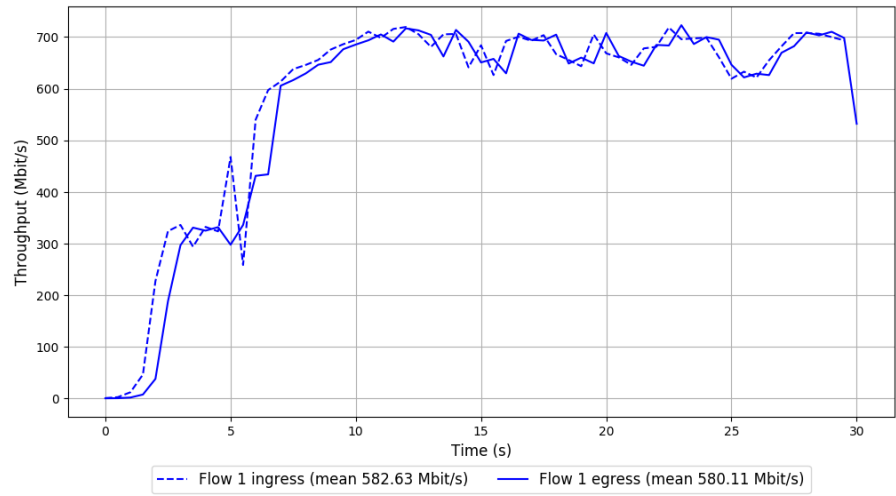
-- Flow 1:

Average throughput: 580.11 Mbit/s

95th percentile per-packet one-way delay: 177.926 ms

Loss rate: 1.06%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-03 09:28:47

End at: 2018-09-03 09:29:17

Local clock offset: 37.389 ms

Remote clock offset: 3.363 ms

Below is generated by plot.py at 2018-09-03 09:42:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 585.42 Mbit/s

95th percentile per-packet one-way delay: 202.464 ms

Loss rate: 1.05%

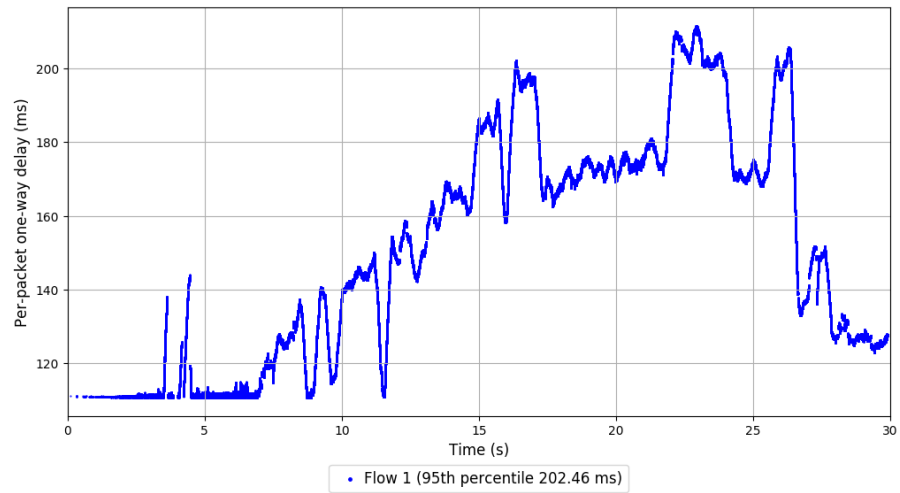
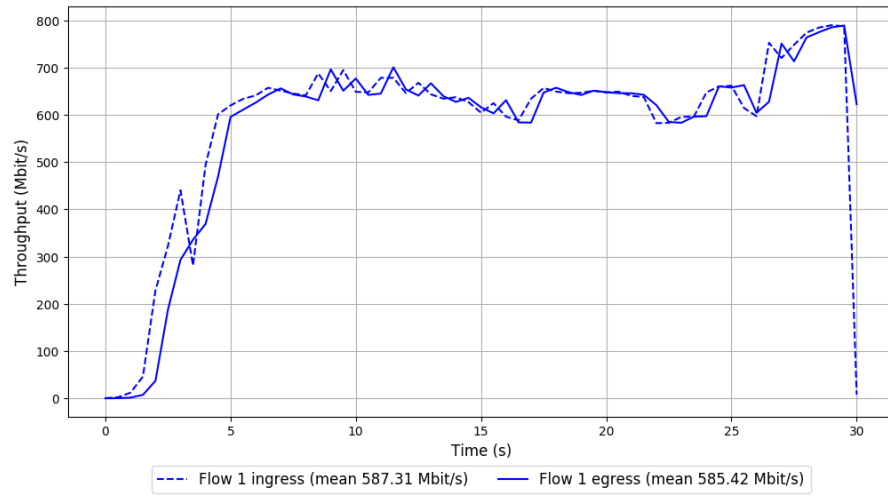
-- Flow 1:

Average throughput: 585.42 Mbit/s

95th percentile per-packet one-way delay: 202.464 ms

Loss rate: 1.05%

Run 2: Report of TCP Cubic — Data Link

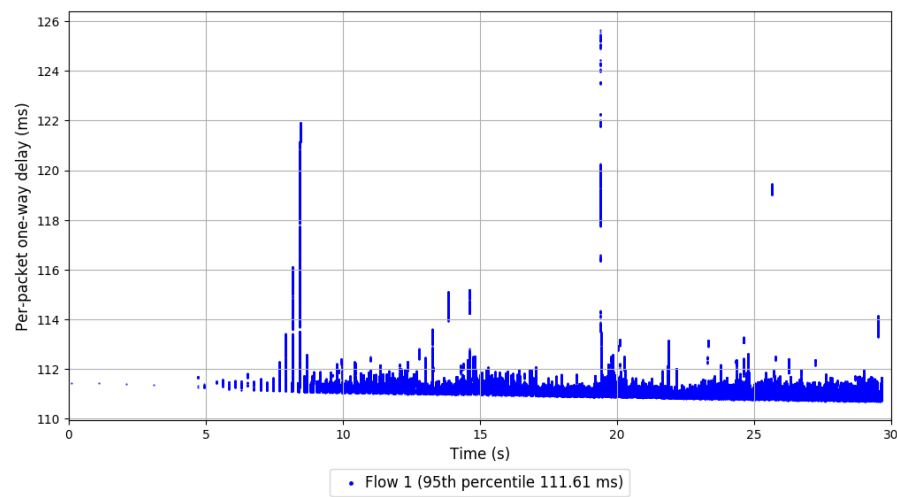
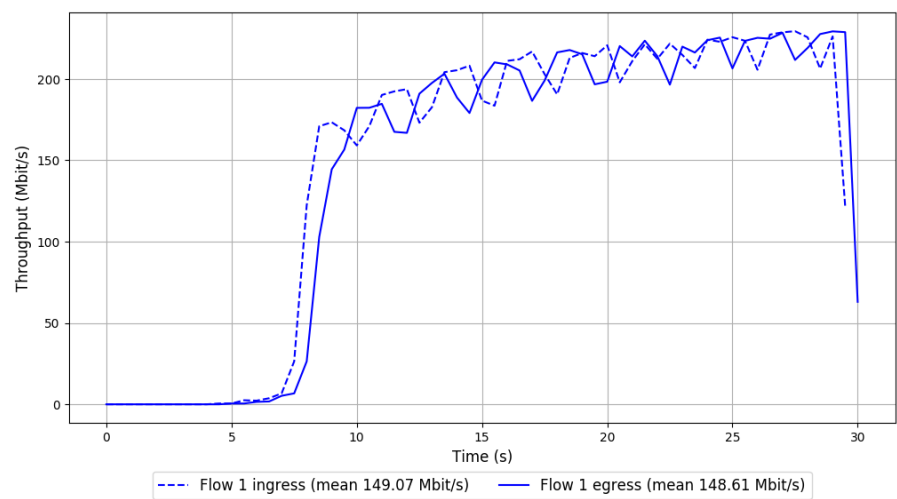


```
Run 1: Statistics of Indigo

Start at: 2018-09-03 09:20:56
End at: 2018-09-03 09:21:26
Local clock offset: 29.484 ms
Remote clock offset: 4.726 ms

# Below is generated by plot.py at 2018-09-03 09:42:06
# Datalink statistics
-- Total of 1 flow:
Average throughput: 148.61 Mbit/s
95th percentile per-packet one-way delay: 111.608 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 148.61 Mbit/s
95th percentile per-packet one-way delay: 111.608 ms
Loss rate: 1.05%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-03 09:27:18

End at: 2018-09-03 09:27:48

Local clock offset: 32.904 ms

Remote clock offset: 4.196 ms

Below is generated by plot.py at 2018-09-03 09:42:06

Datalink statistics

-- Total of 1 flow:

Average throughput: 222.59 Mbit/s

95th percentile per-packet one-way delay: 108.681 ms

Loss rate: 0.78%

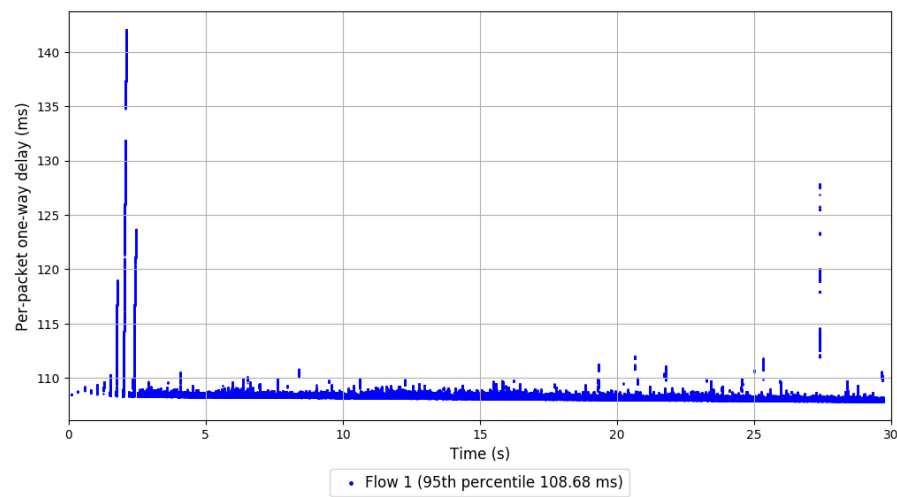
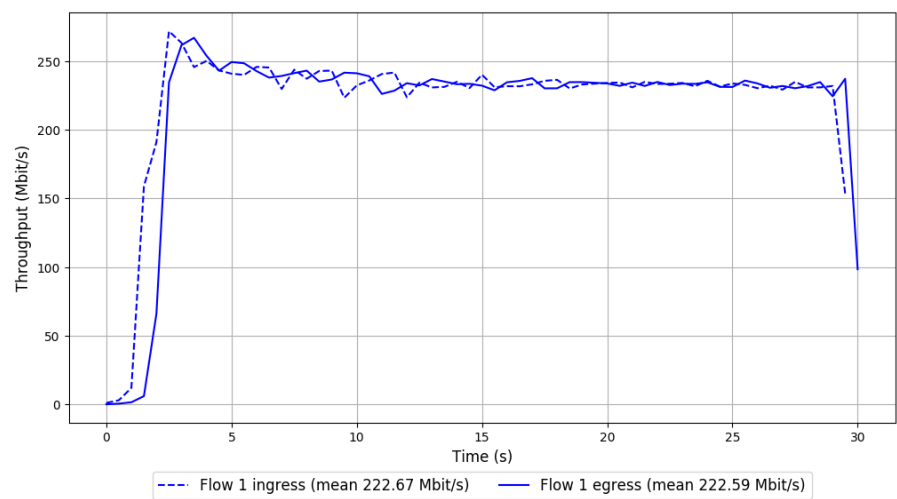
-- Flow 1:

Average throughput: 222.59 Mbit/s

95th percentile per-packet one-way delay: 108.681 ms

Loss rate: 0.78%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-03 09:23:57

End at: 2018-09-03 09:24:27

Local clock offset: 35.233 ms

Remote clock offset: 3.268 ms

Below is generated by plot.py at 2018-09-03 09:42:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 780.67 Mbit/s

95th percentile per-packet one-way delay: 137.095 ms

Loss rate: 0.80%

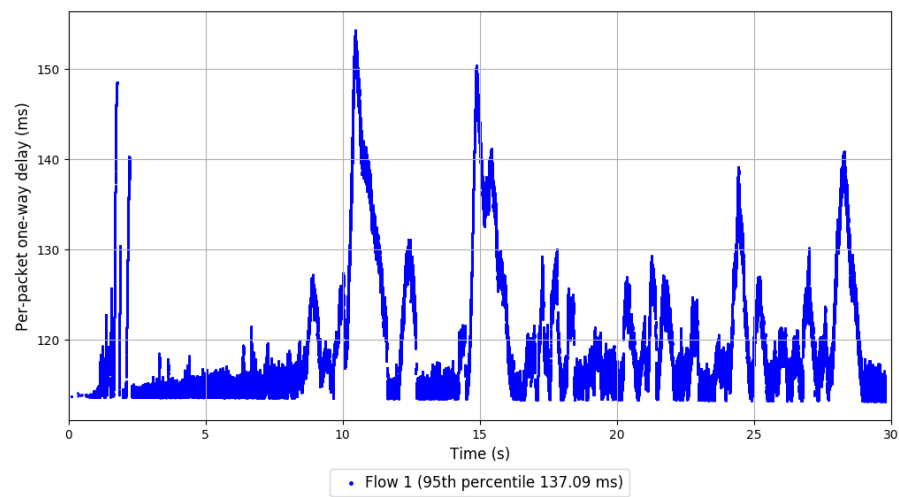
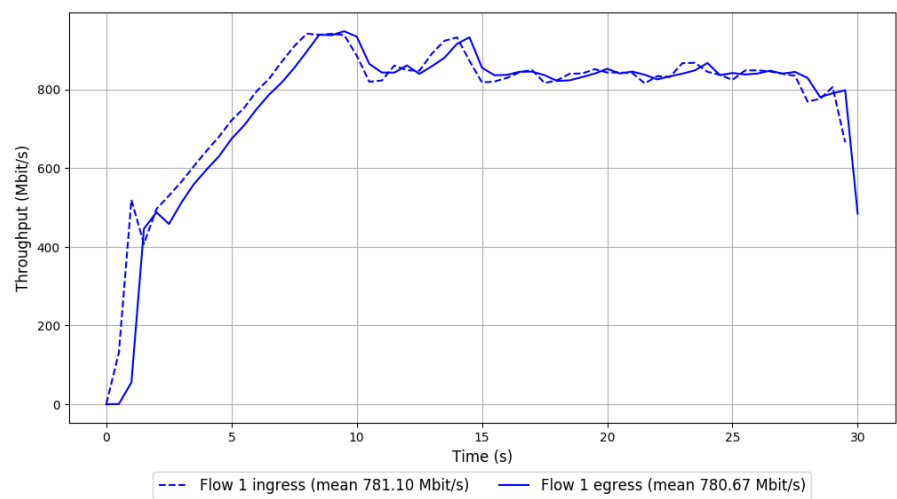
-- Flow 1:

Average throughput: 780.67 Mbit/s

95th percentile per-packet one-way delay: 137.095 ms

Loss rate: 0.80%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-03 09:30:25

End at: 2018-09-03 09:30:55

Local clock offset: 33.85 ms

Remote clock offset: 3.354 ms

Below is generated by plot.py at 2018-09-03 09:42:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 665.76 Mbit/s

95th percentile per-packet one-way delay: 139.198 ms

Loss rate: 0.95%

-- Flow 1:

Average throughput: 665.76 Mbit/s

95th percentile per-packet one-way delay: 139.198 ms

Loss rate: 0.95%

Run 2: Report of Muses-25 — Data Link

