

Pantheon Report

Generated at 2018-09-05 03:24:04 (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.

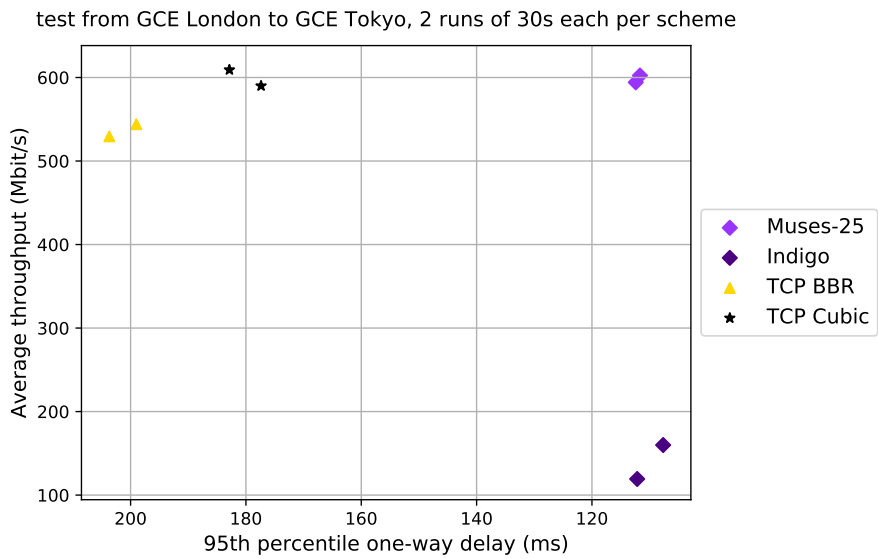
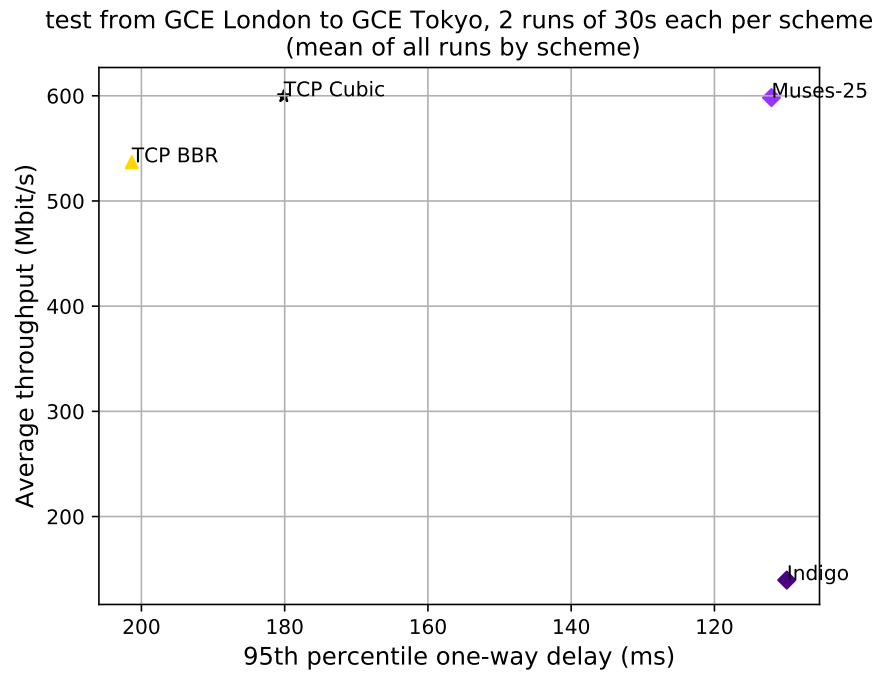
NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.

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 @ 71e71e9a55b945431a7dea72180c1c9381097db9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ 96fbc95fb38373d71fbc80c5a105e62e7636623b
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
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	2	536.81	201.35	1.88
TCP Cubic	2	599.59	180.12	0.89
Indigo	2	139.61	109.90	0.92
Muses-25	2	598.30	112.04	0.80

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 03:07:33

End at: 2018-09-05 03:08:03

Local clock offset: 3.637 ms

Remote clock offset: 1.18 ms

Below is generated by plot.py at 2018-09-05 03:23:40

Datalink statistics

-- Total of 1 flow:

Average throughput: 529.53 Mbit/s

95th percentile per-packet one-way delay: 203.686 ms

Loss rate: 1.78%

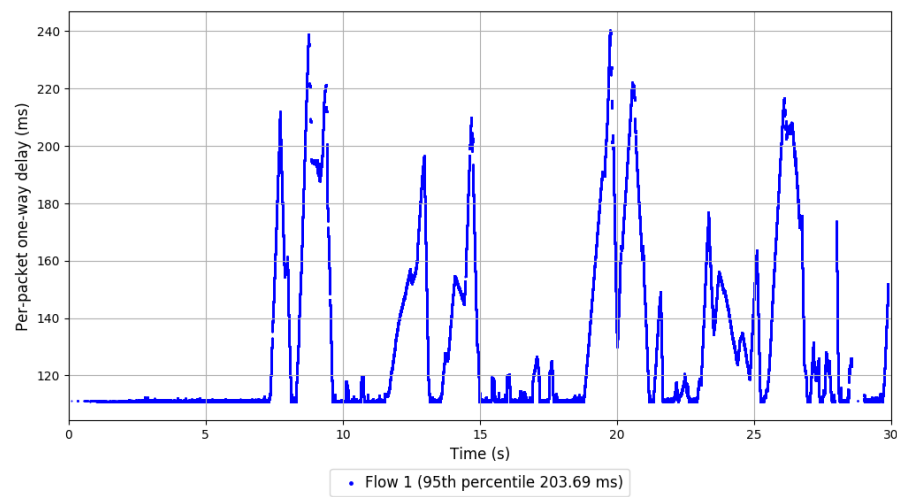
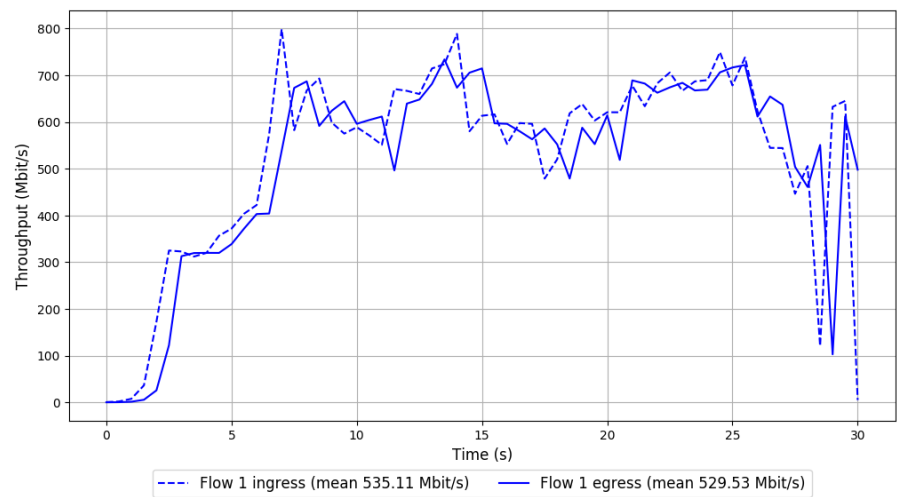
-- Flow 1:

Average throughput: 529.53 Mbit/s

95th percentile per-packet one-way delay: 203.686 ms

Loss rate: 1.78%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 03:13:58

End at: 2018-09-05 03:14:28

Local clock offset: 0.185 ms

Remote clock offset: 1.189 ms

Below is generated by plot.py at 2018-09-05 03:23:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 544.08 Mbit/s

95th percentile per-packet one-way delay: 199.006 ms

Loss rate: 1.97%

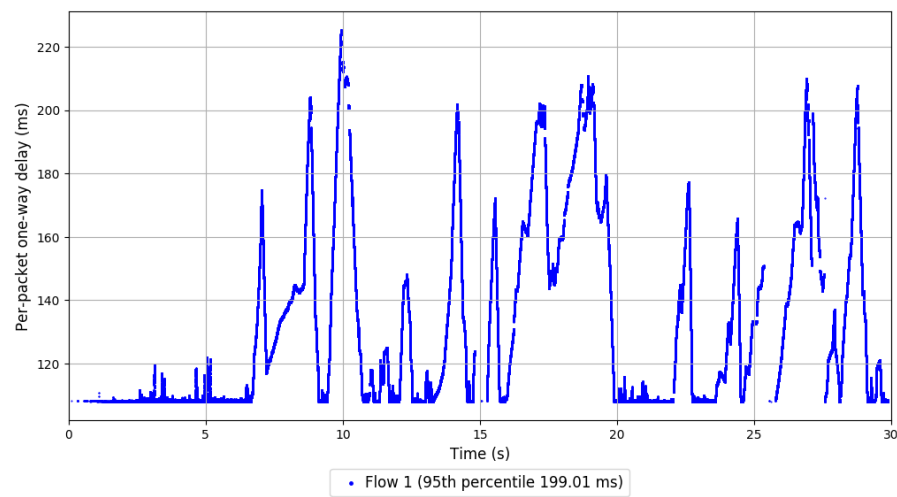
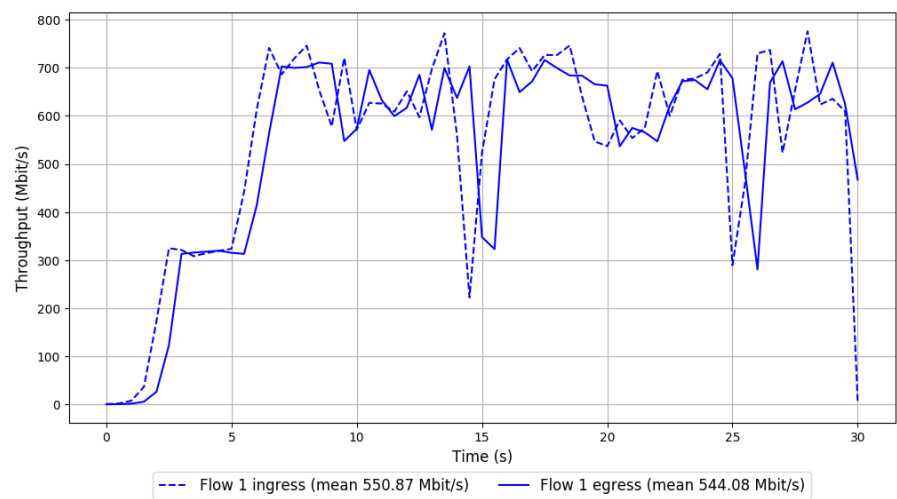
-- Flow 1:

Average throughput: 544.08 Mbit/s

95th percentile per-packet one-way delay: 199.006 ms

Loss rate: 1.97%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 03:05:51

End at: 2018-09-05 03:06:21

Local clock offset: 6.827 ms

Remote clock offset: 0.82 ms

Below is generated by plot.py at 2018-09-05 03:24:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 609.19 Mbit/s

95th percentile per-packet one-way delay: 182.867 ms

Loss rate: 1.01%

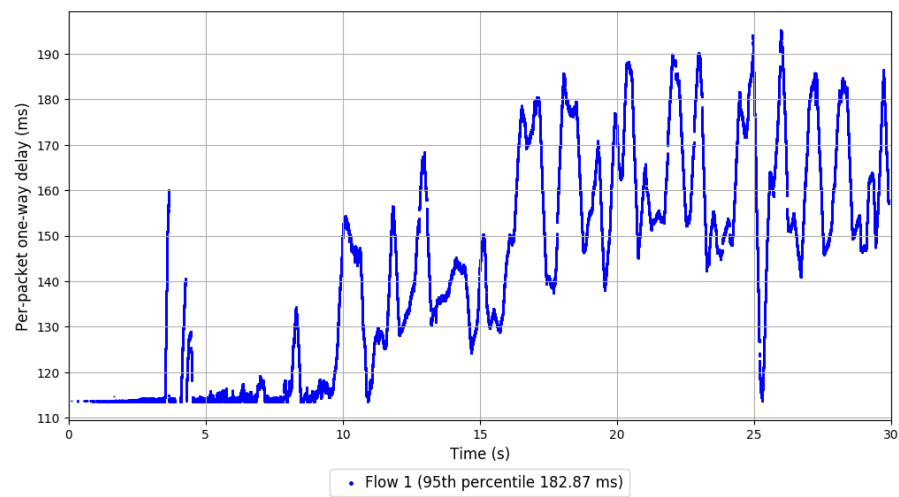
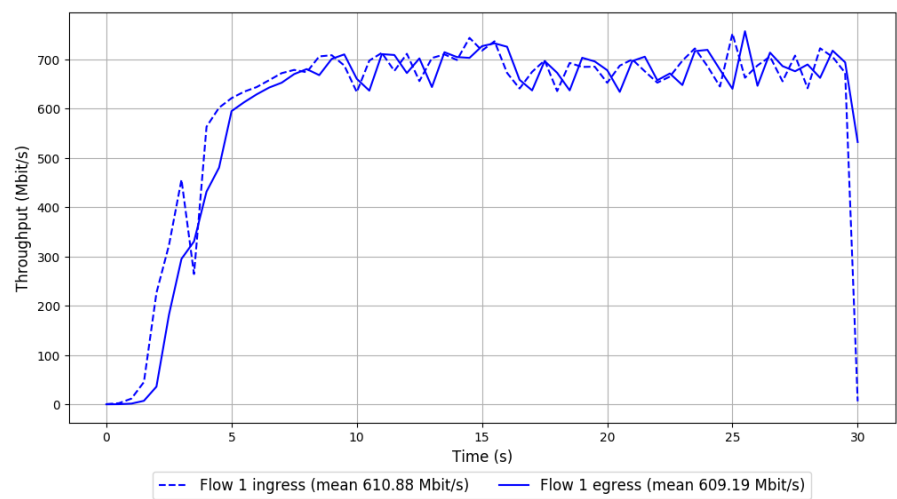
-- Flow 1:

Average throughput: 609.19 Mbit/s

95th percentile per-packet one-way delay: 182.867 ms

Loss rate: 1.01%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 03:12:17

End at: 2018-09-05 03:12:47

Local clock offset: 3.158 ms

Remote clock offset: 1.101 ms

Below is generated by plot.py at 2018-09-05 03:24:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 589.98 Mbit/s

95th percentile per-packet one-way delay: 177.376 ms

Loss rate: 0.77%

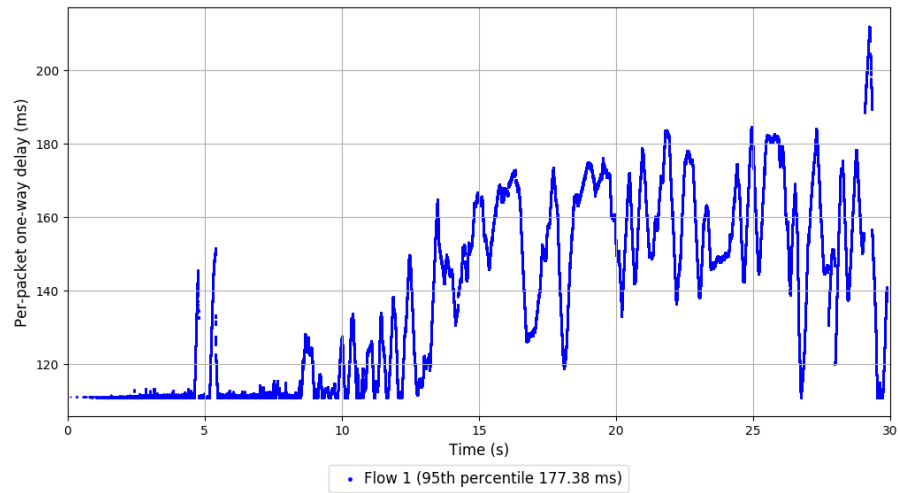
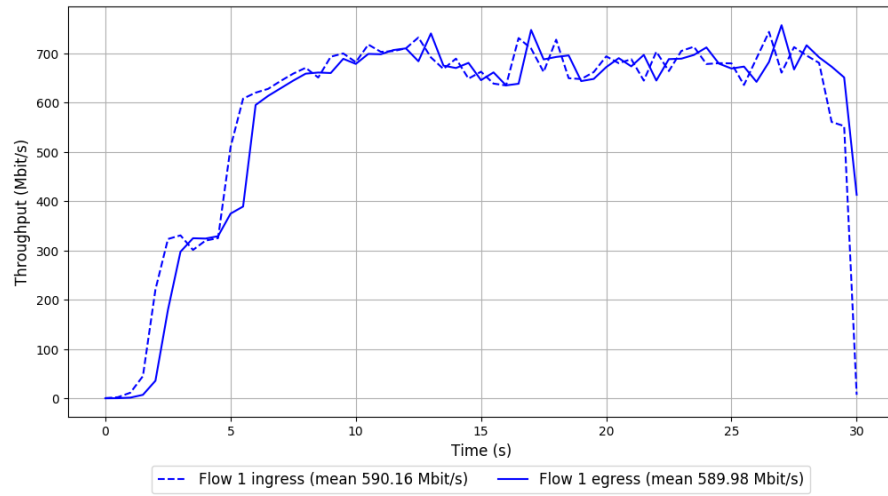
-- Flow 1:

Average throughput: 589.98 Mbit/s

95th percentile per-packet one-way delay: 177.376 ms

Loss rate: 0.77%

Run 2: Report of TCP Cubic — Data Link

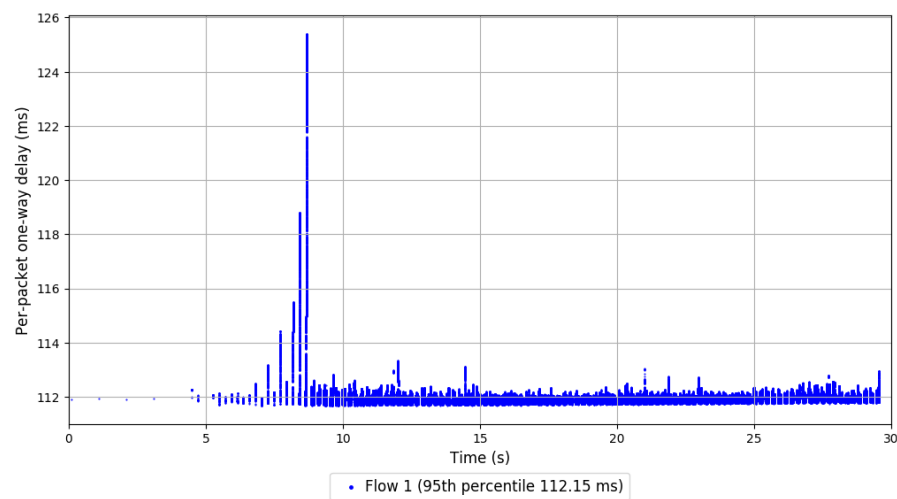
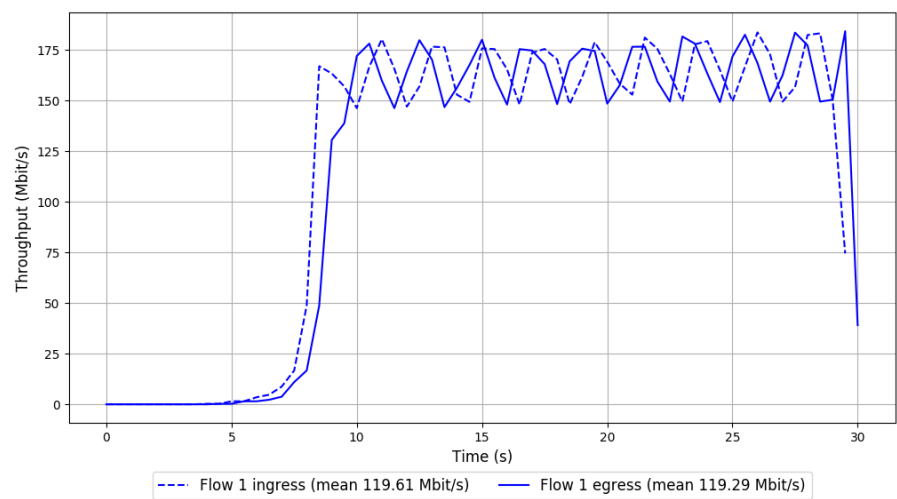


```
Run 1: Statistics of Indigo

Start at: 2018-09-05 03:02:50
End at: 2018-09-05 03:03:20
Local clock offset: 5.105 ms
Remote clock offset: 0.283 ms

# Below is generated by plot.py at 2018-09-05 03:24:03
# Datalink statistics
-- Total of 1 flow:
Average throughput: 119.29 Mbit/s
95th percentile per-packet one-way delay: 112.154 ms
Loss rate: 1.05%
-- Flow 1:
Average throughput: 119.29 Mbit/s
95th percentile per-packet one-way delay: 112.154 ms
Loss rate: 1.05%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 03:09:12

End at: 2018-09-05 03:09:42

Local clock offset: 0.659 ms

Remote clock offset: 1.816 ms

Below is generated by plot.py at 2018-09-05 03:24:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 159.93 Mbit/s

95th percentile per-packet one-way delay: 107.654 ms

Loss rate: 0.78%

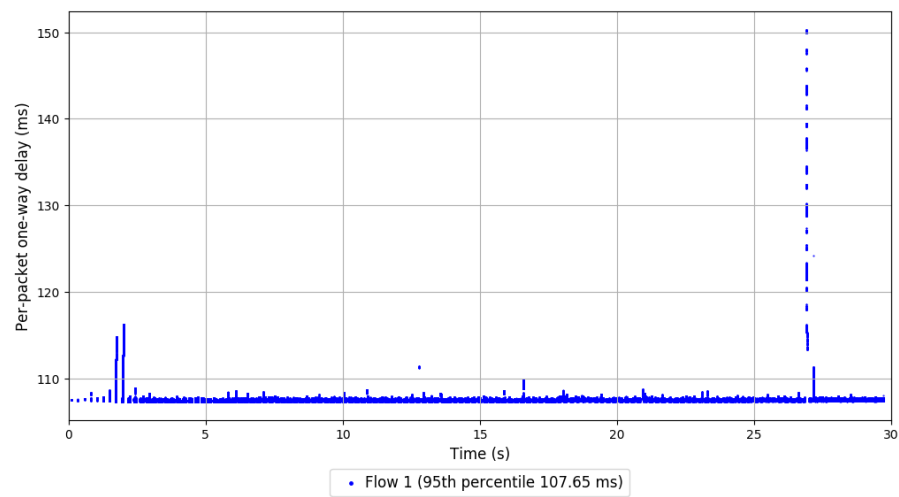
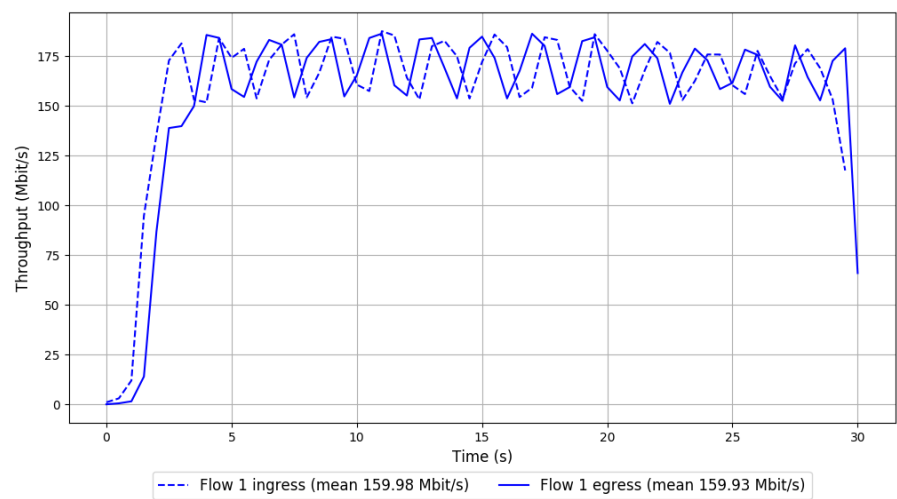
-- Flow 1:

Average throughput: 159.93 Mbit/s

95th percentile per-packet one-way delay: 107.654 ms

Loss rate: 0.78%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-05 03:04:11

End at: 2018-09-05 03:04:41

Local clock offset: 1.598 ms

Remote clock offset: 1.208 ms

Below is generated by plot.py at 2018-09-05 03:24:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 602.35 Mbit/s

95th percentile per-packet one-way delay: 111.674 ms

Loss rate: 0.80%

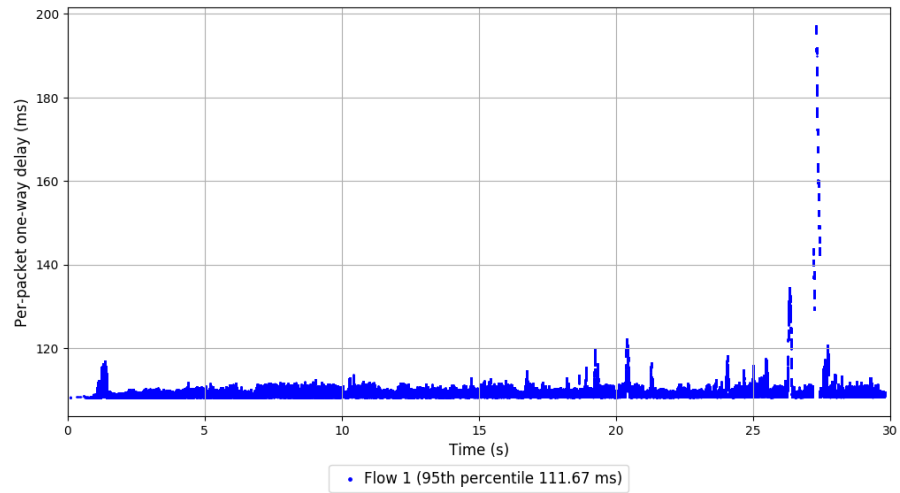
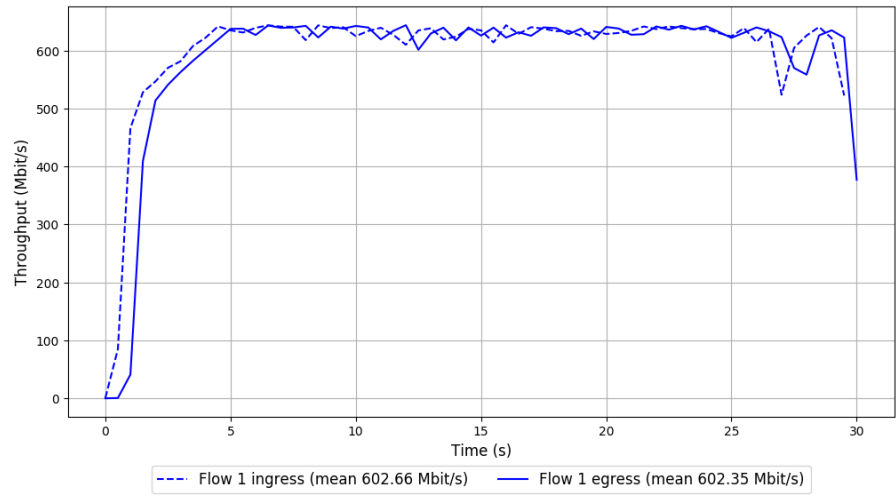
-- Flow 1:

Average throughput: 602.35 Mbit/s

95th percentile per-packet one-way delay: 111.674 ms

Loss rate: 0.80%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 03:10:37

End at: 2018-09-05 03:11:07

Local clock offset: 0.504 ms

Remote clock offset: 1.734 ms

Below is generated by plot.py at 2018-09-05 03:24:03

Datalink statistics

-- Total of 1 flow:

Average throughput: 594.24 Mbit/s

95th percentile per-packet one-way delay: 112.404 ms

Loss rate: 0.80%

-- Flow 1:

Average throughput: 594.24 Mbit/s

95th percentile per-packet one-way delay: 112.404 ms

Loss rate: 0.80%

Run 2: Report of Muses-25 — Data Link

