

Pantheon Report

Generated at 2018-09-05 02:28:29 (UTC).

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

Repeated the test of 4 congestion control schemes twice.

Each test lasted for 30 seconds running 1 flow.

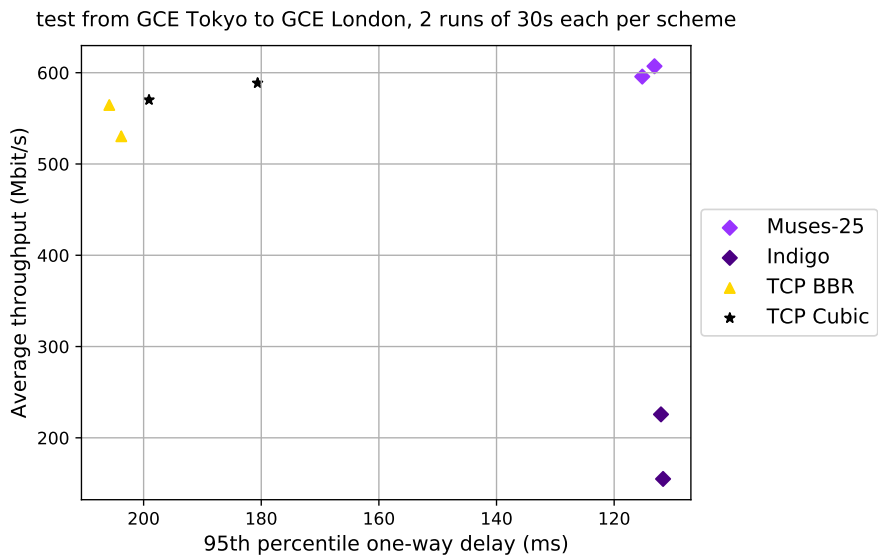
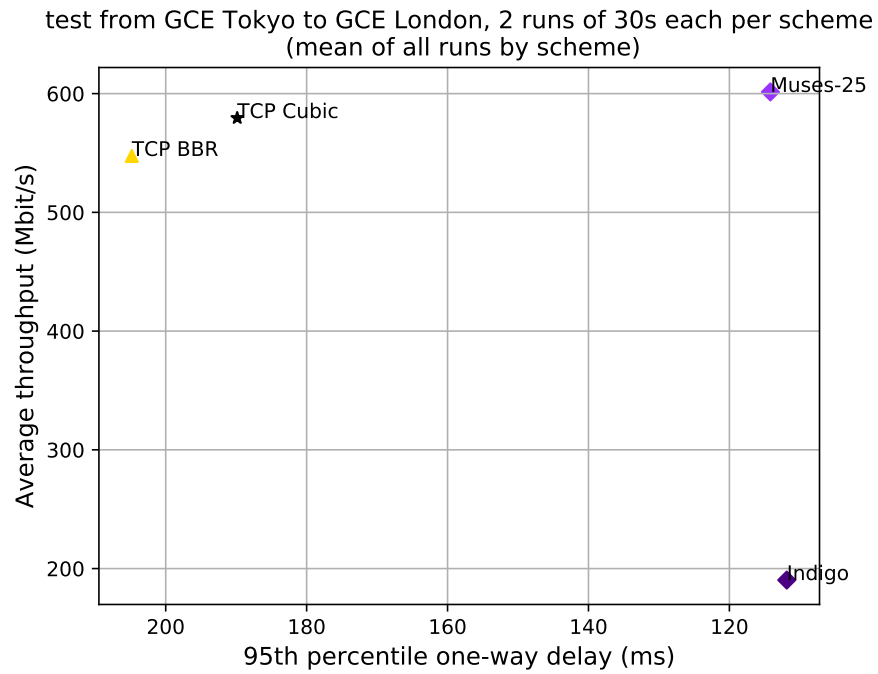
NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.

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	547.50	204.82	1.08
TCP Cubic	2	579.45	189.85	0.11
Indigo	2	190.31	111.86	0.00
Muses-25	2	601.41	114.18	0.00

Run 1: Statistics of TCP BBR

Start at: 2018-09-05 02:11:27

End at: 2018-09-05 02:11:57

Local clock offset: 22.864 ms

Remote clock offset: 7.754 ms

Below is generated by plot.py at 2018-09-05 02:28:07

Datalink statistics

-- Total of 1 flow:

Average throughput: 530.35 Mbit/s

95th percentile per-packet one-way delay: 203.796 ms

Loss rate: 1.07%

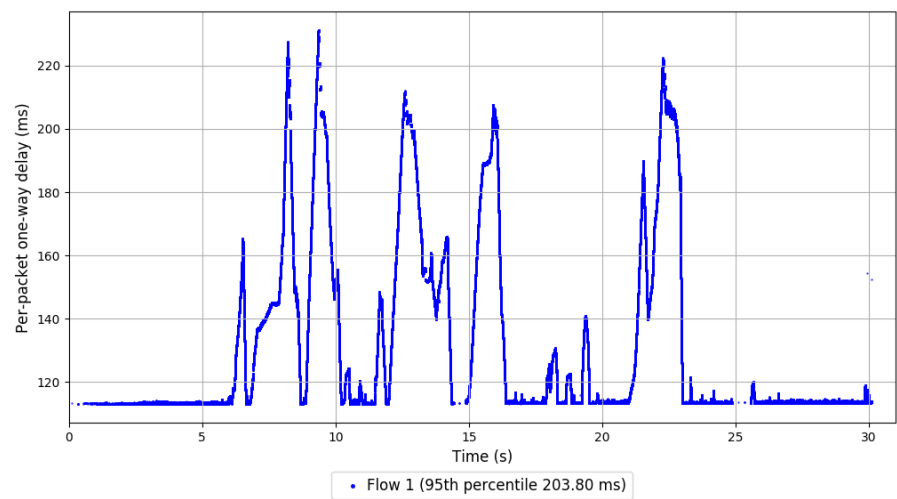
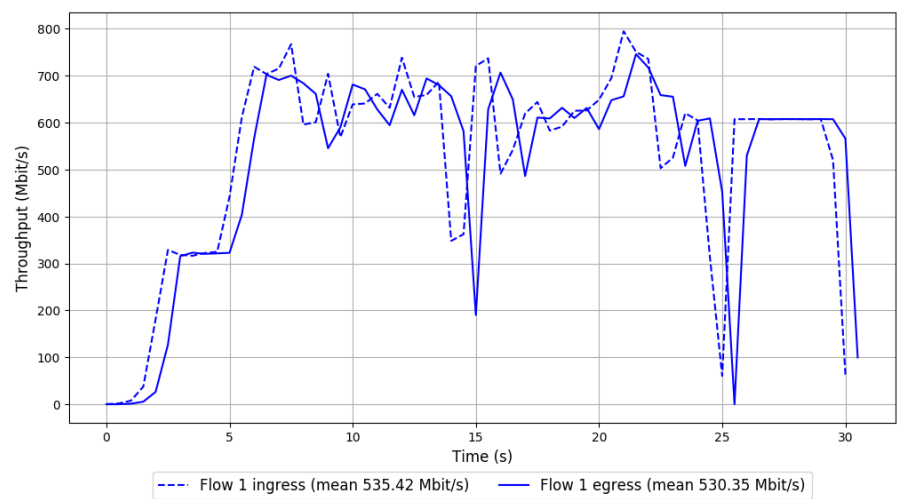
-- Flow 1:

Average throughput: 530.35 Mbit/s

95th percentile per-packet one-way delay: 203.796 ms

Loss rate: 1.07%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-05 02:17:59

End at: 2018-09-05 02:18:29

Local clock offset: 31.442 ms

Remote clock offset: 8.067 ms

Below is generated by plot.py at 2018-09-05 02:28:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 564.64 Mbit/s

95th percentile per-packet one-way delay: 205.835 ms

Loss rate: 1.09%

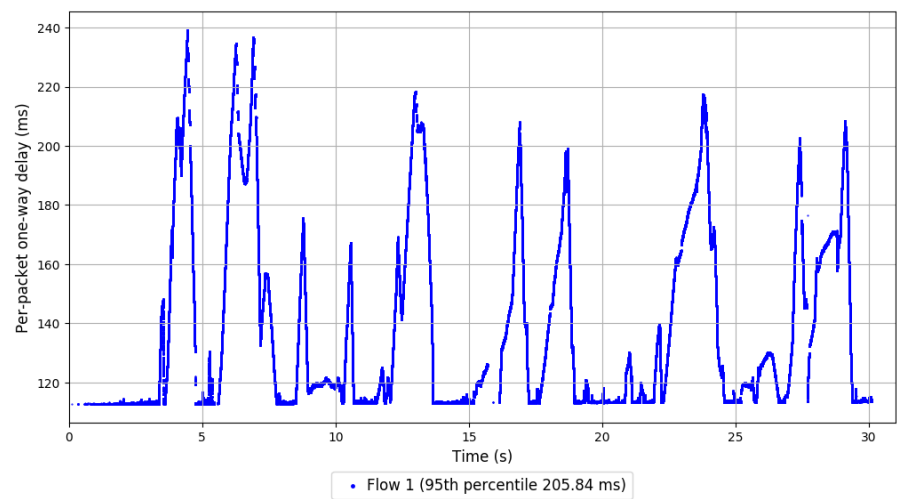
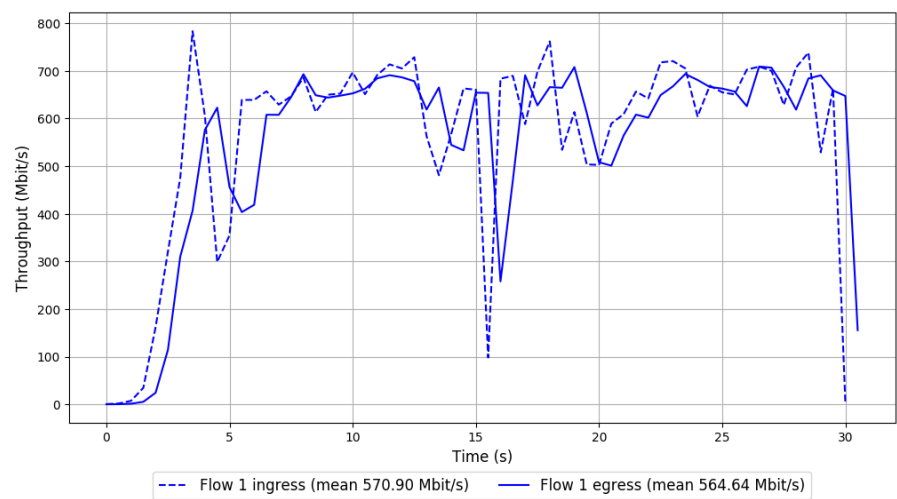
-- Flow 1:

Average throughput: 564.64 Mbit/s

95th percentile per-packet one-way delay: 205.835 ms

Loss rate: 1.09%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-05 02:06:41

End at: 2018-09-05 02:07:11

Local clock offset: 18.967 ms

Remote clock offset: 8.493 ms

Below is generated by plot.py at 2018-09-05 02:28:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 570.23 Mbit/s

95th percentile per-packet one-way delay: 199.081 ms

Loss rate: 0.20%

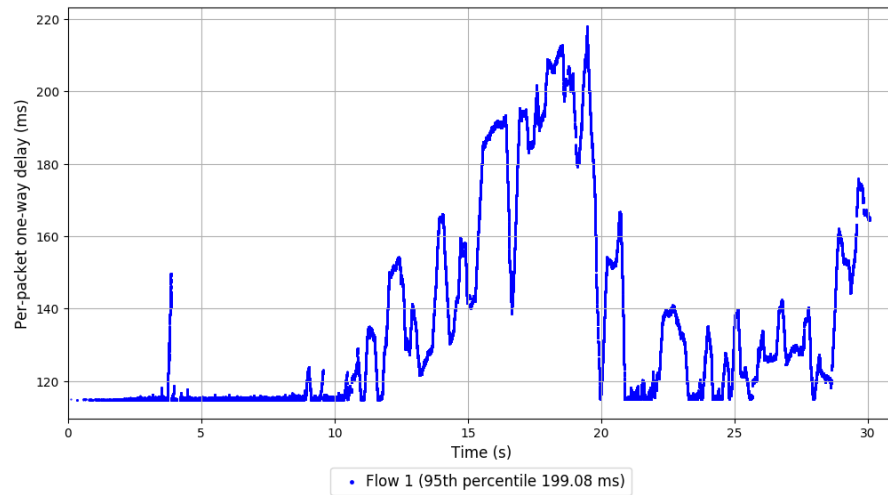
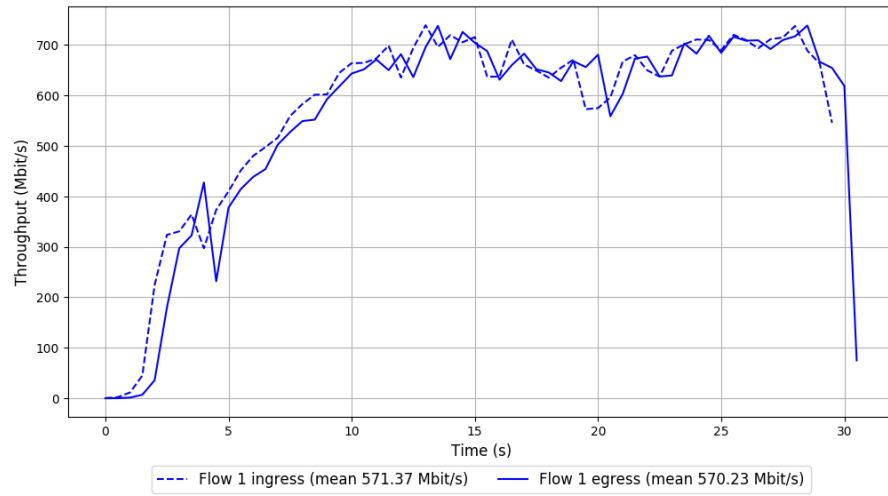
-- Flow 1:

Average throughput: 570.23 Mbit/s

95th percentile per-packet one-way delay: 199.081 ms

Loss rate: 0.20%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-05 02:13:07

End at: 2018-09-05 02:13:37

Local clock offset: 24.266 ms

Remote clock offset: 8.275 ms

Below is generated by plot.py at 2018-09-05 02:28:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 588.68 Mbit/s

95th percentile per-packet one-way delay: 180.621 ms

Loss rate: 0.02%

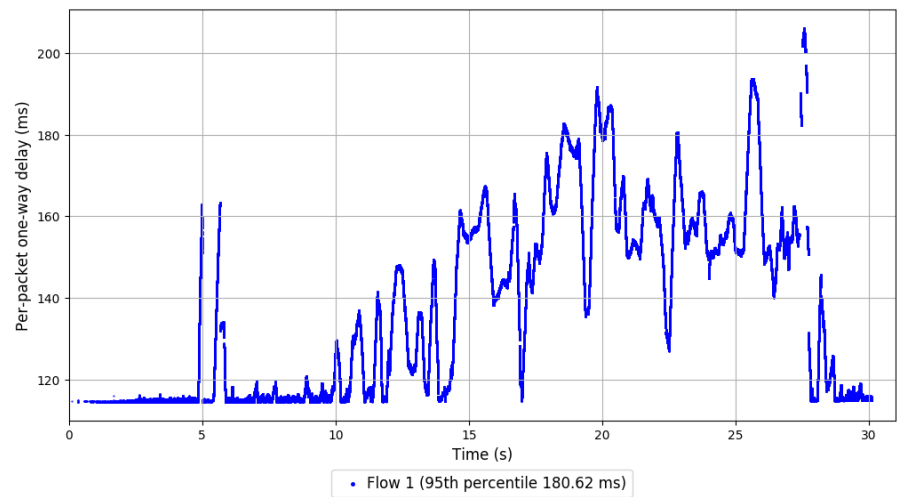
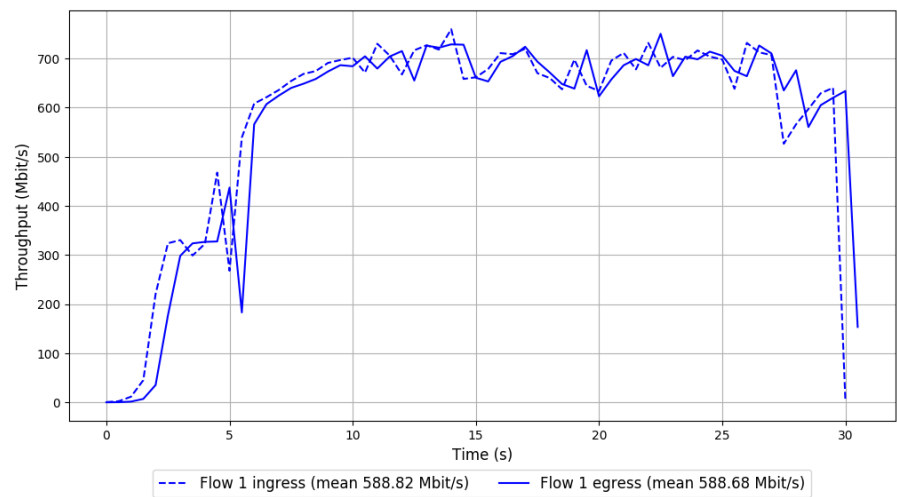
-- Flow 1:

Average throughput: 588.68 Mbit/s

95th percentile per-packet one-way delay: 180.621 ms

Loss rate: 0.02%

Run 2: Report of TCP Cubic — Data Link

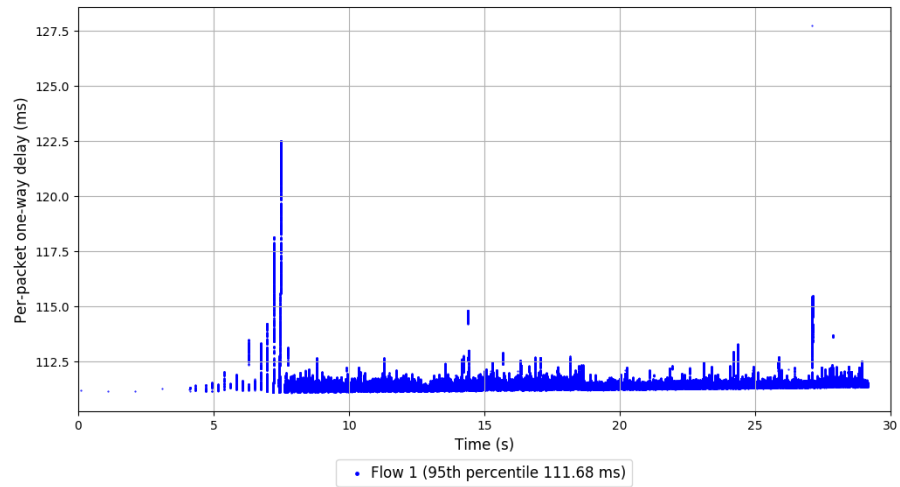
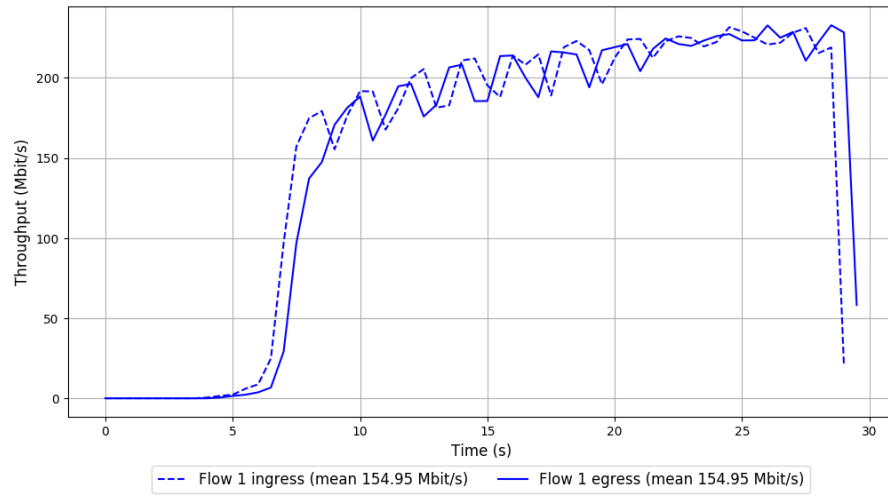


```
Run 1: Statistics of Indigo

Start at: 2018-09-05 02:08:22
End at: 2018-09-05 02:08:52
Local clock offset: 23.269 ms
Remote clock offset: 7.705 ms

# Below is generated by plot.py at 2018-09-05 02:28:26
# Datalink statistics
-- Total of 1 flow:
Average throughput: 154.95 Mbit/s
95th percentile per-packet one-way delay: 111.683 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 154.95 Mbit/s
95th percentile per-packet one-way delay: 111.683 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-05 02:14:48

End at: 2018-09-05 02:15:18

Local clock offset: 28.401 ms

Remote clock offset: 8.53 ms

Below is generated by plot.py at 2018-09-05 02:28:26

Datalink statistics

-- Total of 1 flow:

Average throughput: 225.68 Mbit/s

95th percentile per-packet one-way delay: 112.038 ms

Loss rate: 0.00%

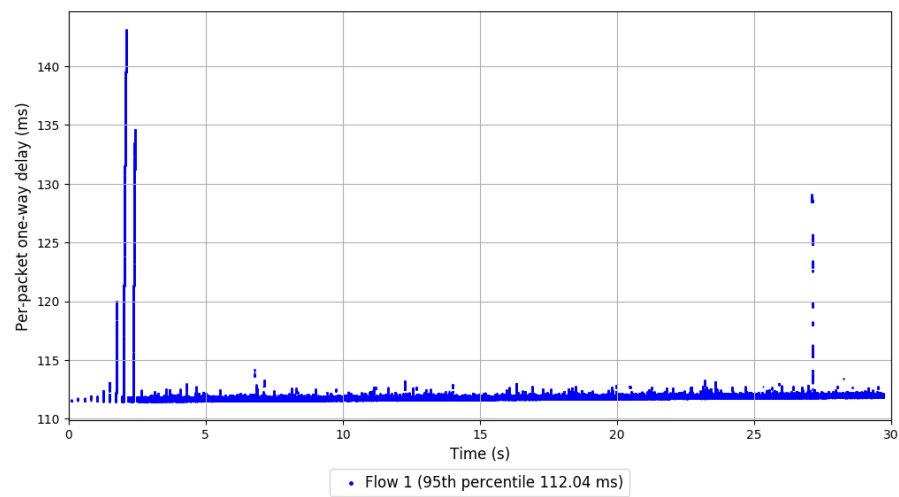
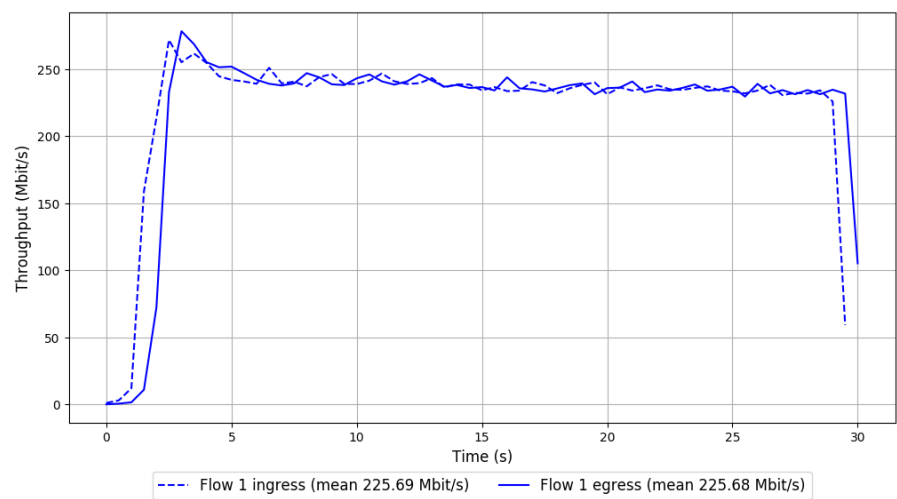
-- Flow 1:

Average throughput: 225.68 Mbit/s

95th percentile per-packet one-way delay: 112.038 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-05 02:09:46

End at: 2018-09-05 02:10:16

Local clock offset: 23.994 ms

Remote clock offset: 7.24 ms

Below is generated by plot.py at 2018-09-05 02:28:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 607.10 Mbit/s

95th percentile per-packet one-way delay: 113.142 ms

Loss rate: 0.00%

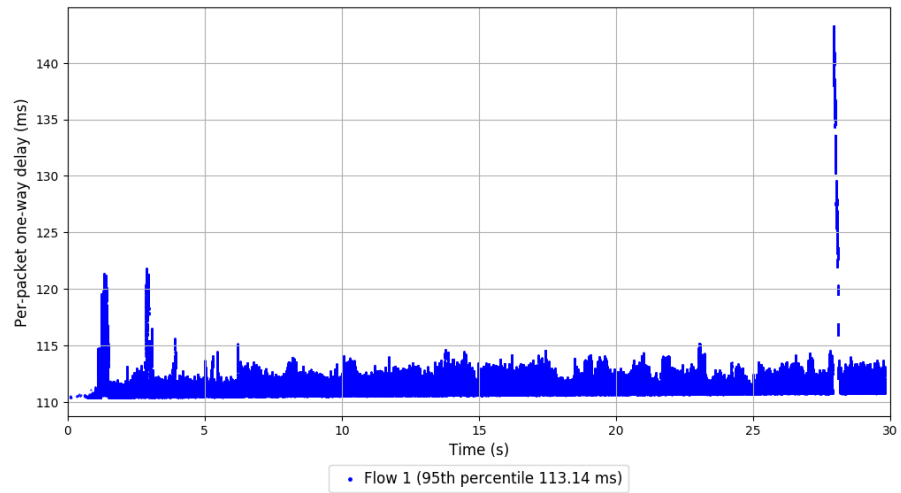
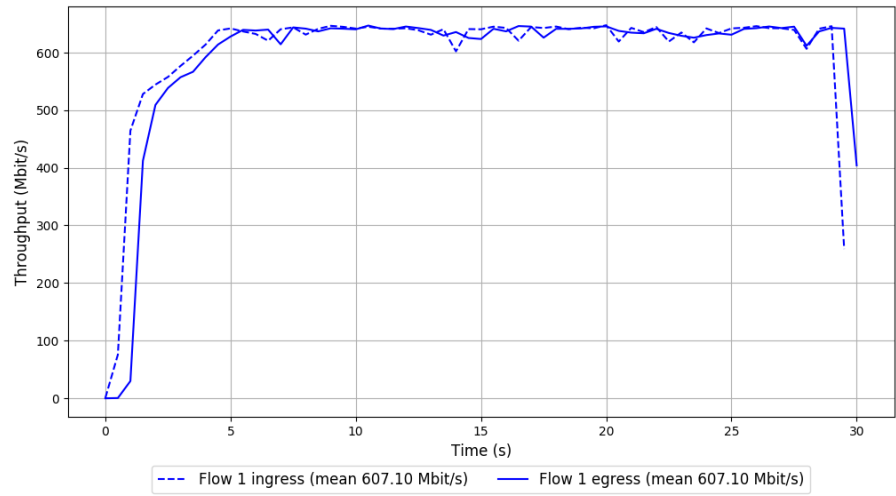
-- Flow 1:

Average throughput: 607.10 Mbit/s

95th percentile per-packet one-way delay: 113.142 ms

Loss rate: 0.00%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-05 02:16:19

End at: 2018-09-05 02:16:49

Local clock offset: 29.917 ms

Remote clock offset: 8.125 ms

Below is generated by plot.py at 2018-09-05 02:28:28

Datalink statistics

-- Total of 1 flow:

Average throughput: 595.73 Mbit/s

95th percentile per-packet one-way delay: 115.220 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 595.73 Mbit/s

95th percentile per-packet one-way delay: 115.220 ms

Loss rate: 0.00%

Run 2: Report of Muses-25 — Data Link

