

Pantheon Report

Generated at 2018-09-03 10:42:04 (UTC).

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

Repeated the test of 4 congestion control schemes twice.

Each test lasted for 30 seconds running 1 flow.

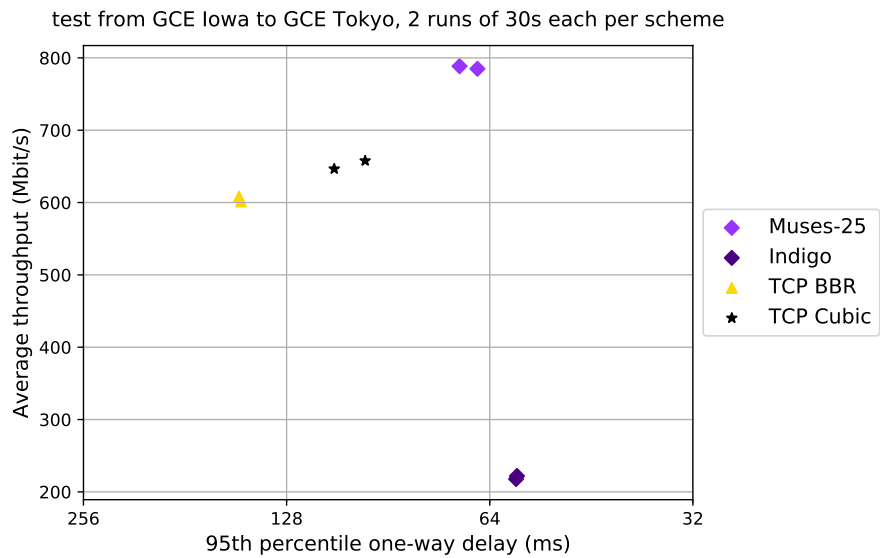
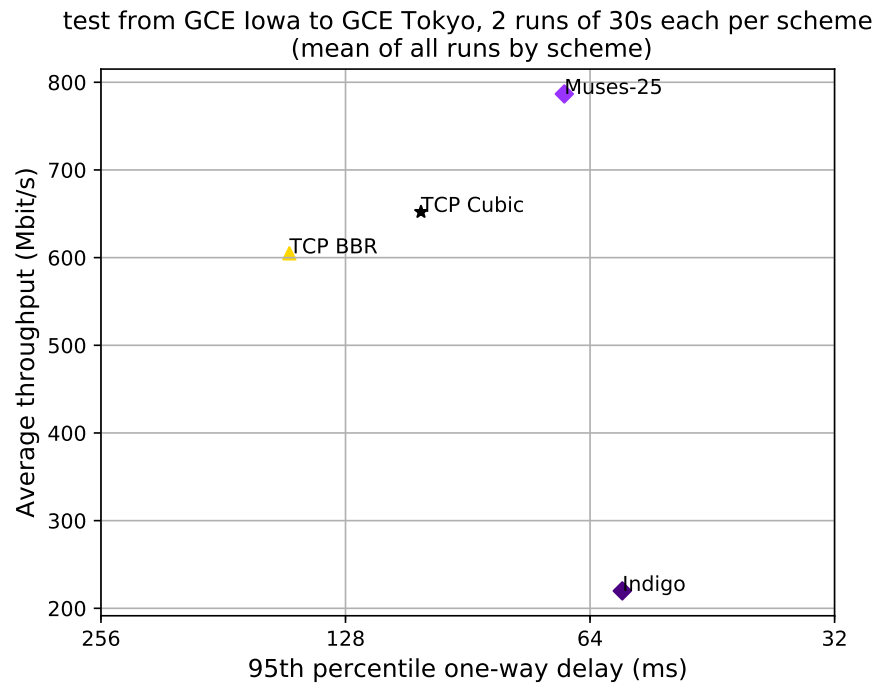
NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.

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 @ f309f5459e2c5237279a184e52ece7a2b47ef1c9
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b8d5019b83a3a678804d830fcfe1da7b3a63421b
third_party/pantheon-tunnel @ cbfce6db5ff5740d4fe1771f813cd646339e1952
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	604.89	150.06	0.53
TCP Cubic	2	652.13	103.35	0.03
Indigo	2	219.86	58.41	0.00
Muses-25	2	786.70	68.84	0.00

Run 1: Statistics of TCP BBR

Start at: 2018-09-03 10:22:13

End at: 2018-09-03 10:22:43

Local clock offset: 1.637 ms

Remote clock offset: 1.59 ms

Below is generated by plot.py at 2018-09-03 10:41:34

Datalink statistics

-- Total of 1 flow:

Average throughput: 601.41 Mbit/s

95th percentile per-packet one-way delay: 149.571 ms

Loss rate: 0.53%

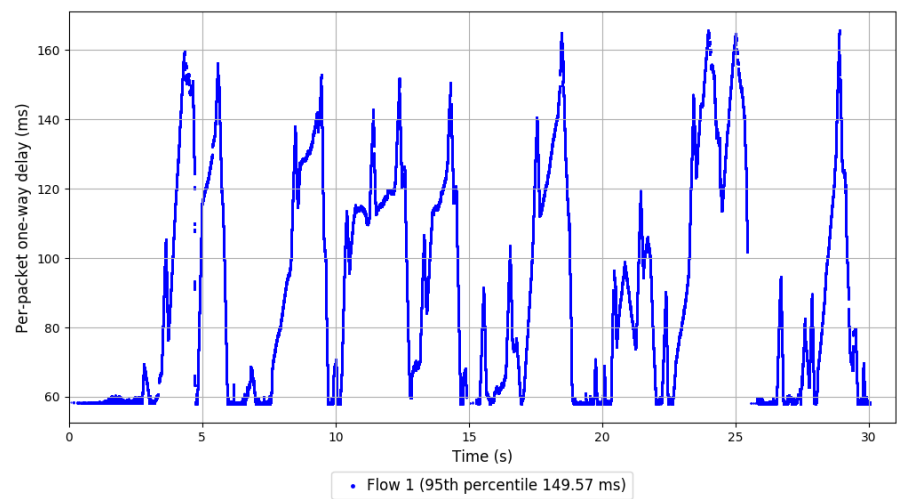
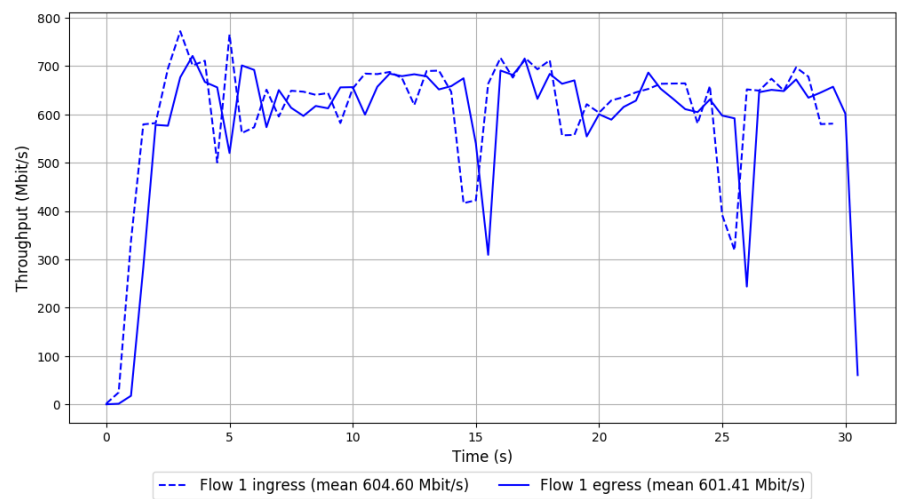
-- Flow 1:

Average throughput: 601.41 Mbit/s

95th percentile per-packet one-way delay: 149.571 ms

Loss rate: 0.53%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-09-03 10:28:28

End at: 2018-09-03 10:28:58

Local clock offset: 1.029 ms

Remote clock offset: 3.916 ms

Below is generated by plot.py at 2018-09-03 10:41:36

Datalink statistics

-- Total of 1 flow:

Average throughput: 608.37 Mbit/s

95th percentile per-packet one-way delay: 150.558 ms

Loss rate: 0.53%

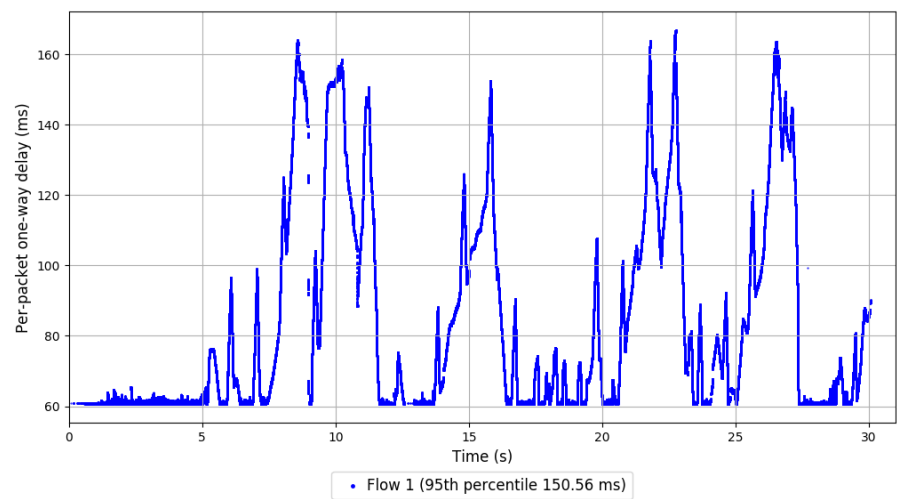
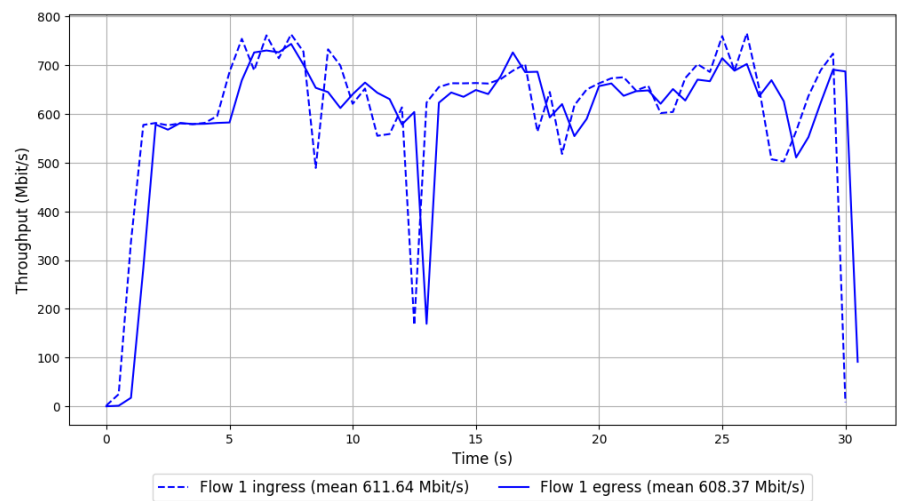
-- Flow 1:

Average throughput: 608.37 Mbit/s

95th percentile per-packet one-way delay: 150.558 ms

Loss rate: 0.53%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-09-03 10:19:10

End at: 2018-09-03 10:19:40

Local clock offset: 2.211 ms

Remote clock offset: 4.637 ms

Below is generated by plot.py at 2018-09-03 10:41:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 657.74 Mbit/s

95th percentile per-packet one-way delay: 97.901 ms

Loss rate: 0.00%

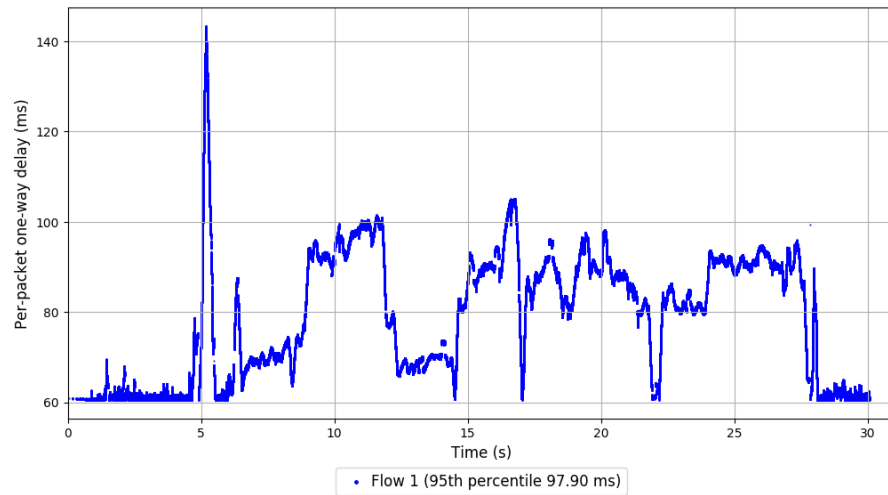
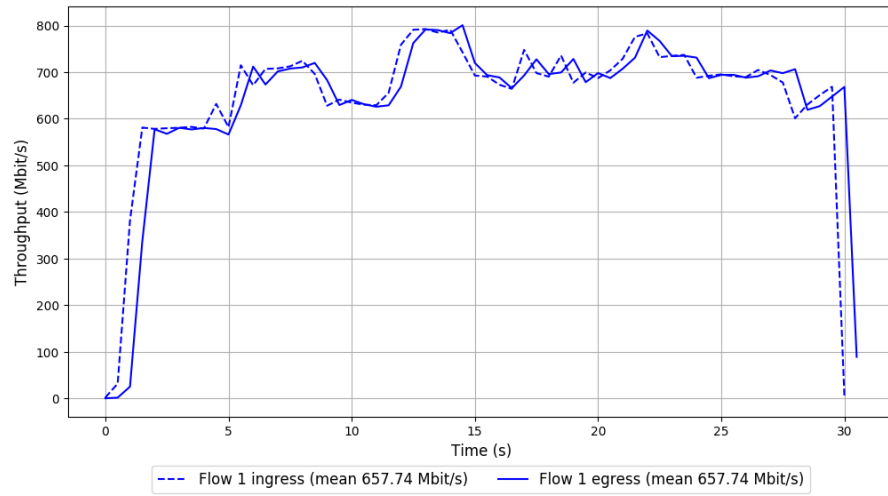
-- Flow 1:

Average throughput: 657.74 Mbit/s

95th percentile per-packet one-way delay: 97.901 ms

Loss rate: 0.00%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-03 10:25:26

End at: 2018-09-03 10:25:56

Local clock offset: 1.23 ms

Remote clock offset: 4.014 ms

Below is generated by plot.py at 2018-09-03 10:41:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 646.53 Mbit/s

95th percentile per-packet one-way delay: 108.802 ms

Loss rate: 0.05%

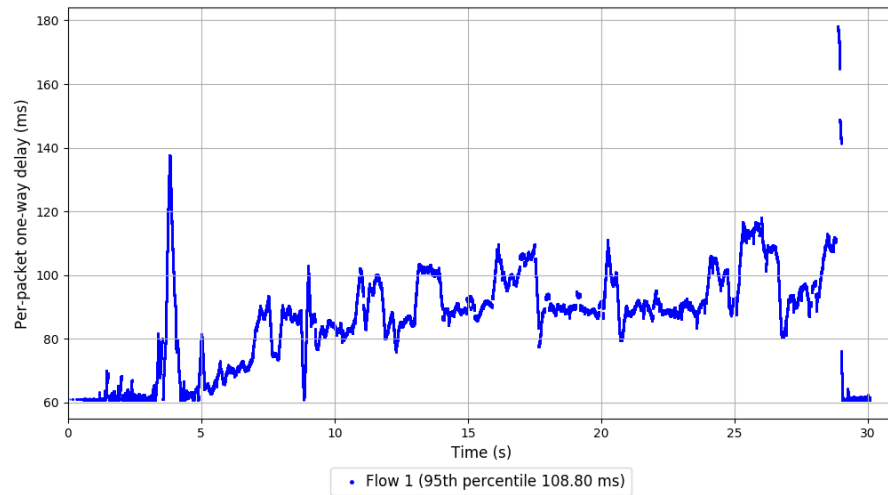
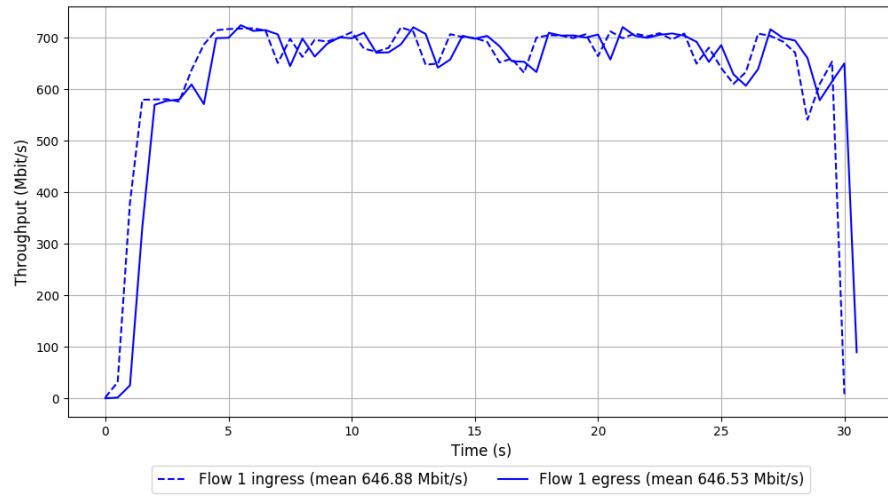
-- Flow 1:

Average throughput: 646.53 Mbit/s

95th percentile per-packet one-way delay: 108.802 ms

Loss rate: 0.05%

Run 2: Report of TCP Cubic — Data Link

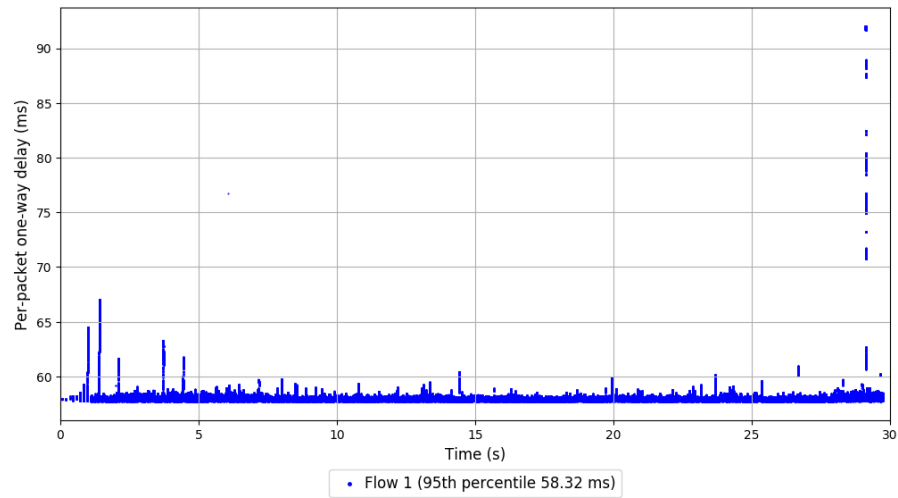
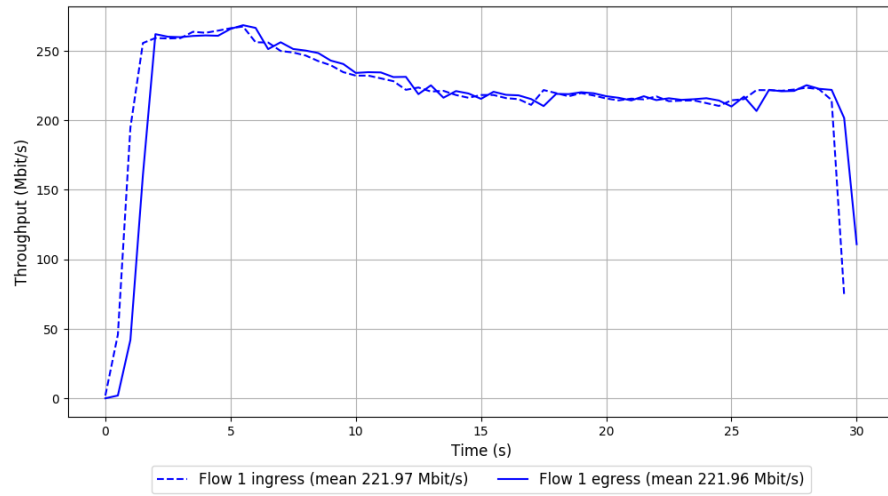


```
Run 1: Statistics of Indigo

Start at: 2018-09-03 10:20:47
End at: 2018-09-03 10:21:17
Local clock offset: 1.914 ms
Remote clock offset: 1.587 ms

# Below is generated by plot.py at 2018-09-03 10:41:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 221.96 Mbit/s
95th percentile per-packet one-way delay: 58.318 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 221.96 Mbit/s
95th percentile per-packet one-way delay: 58.318 ms
Loss rate: 0.00%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-09-03 10:27:03

End at: 2018-09-03 10:27:33

Local clock offset: 1.131 ms

Remote clock offset: 1.121 ms

Below is generated by plot.py at 2018-09-03 10:41:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 217.76 Mbit/s

95th percentile per-packet one-way delay: 58.498 ms

Loss rate: 0.00%

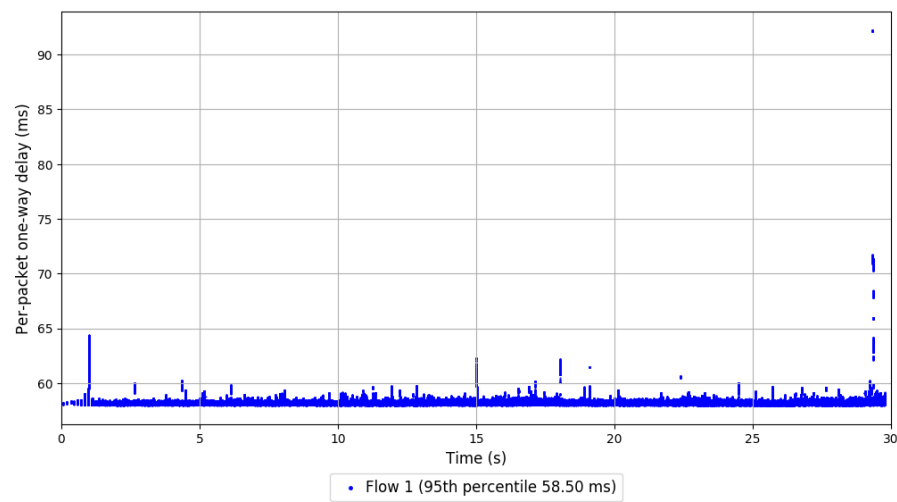
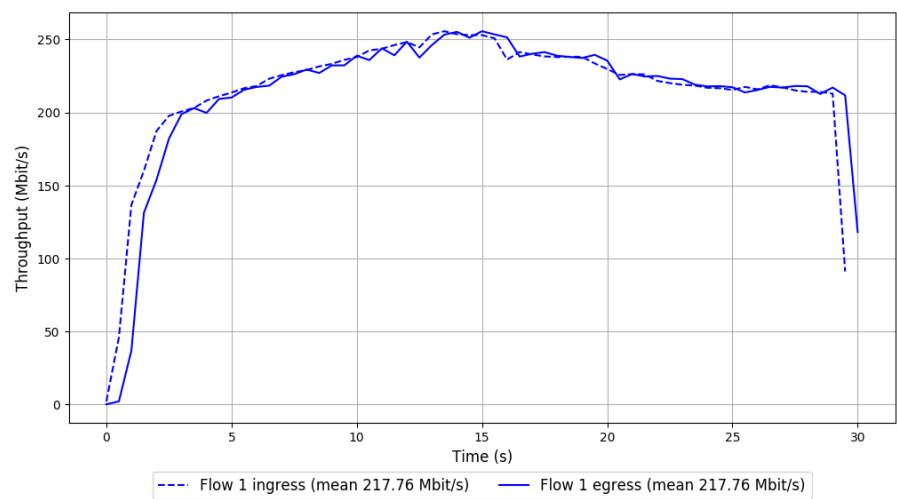
-- Flow 1:

Average throughput: 217.76 Mbit/s

95th percentile per-packet one-way delay: 58.498 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-03 10:23:49

End at: 2018-09-03 10:24:19

Local clock offset: 1.403 ms

Remote clock offset: 1.469 ms

Below is generated by plot.py at 2018-09-03 10:42:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 784.93 Mbit/s

95th percentile per-packet one-way delay: 66.743 ms

Loss rate: 0.00%

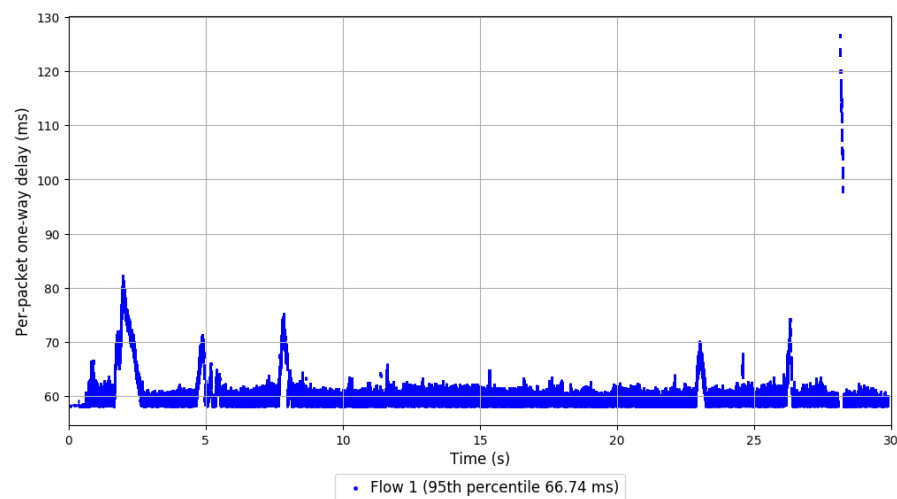
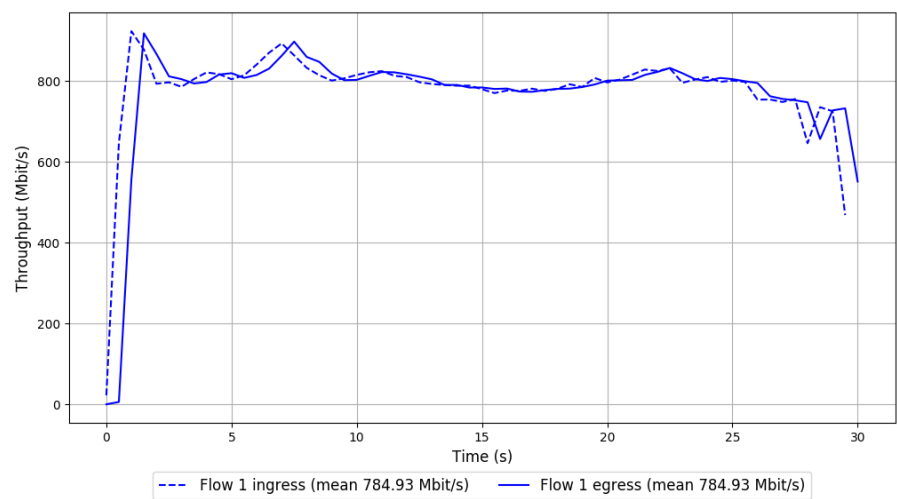
-- Flow 1:

Average throughput: 784.93 Mbit/s

95th percentile per-packet one-way delay: 66.743 ms

Loss rate: 0.00%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-03 10:30:05

End at: 2018-09-03 10:30:35

Local clock offset: 0.988 ms

Remote clock offset: 6.718 ms

Below is generated by plot.py at 2018-09-03 10:42:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 788.47 Mbit/s

95th percentile per-packet one-way delay: 70.939 ms

Loss rate: 0.00%

-- Flow 1:

Average throughput: 788.47 Mbit/s

95th percentile per-packet one-way delay: 70.939 ms

Loss rate: 0.00%

Run 2: Report of Muses-25 — Data Link

