

Pantheon Report

Generated at 2018-09-03 13:37:34 (UTC).

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

Repeated the test of 4 congestion control schemes twice.

Each test lasted for 30 seconds running 1 flow.

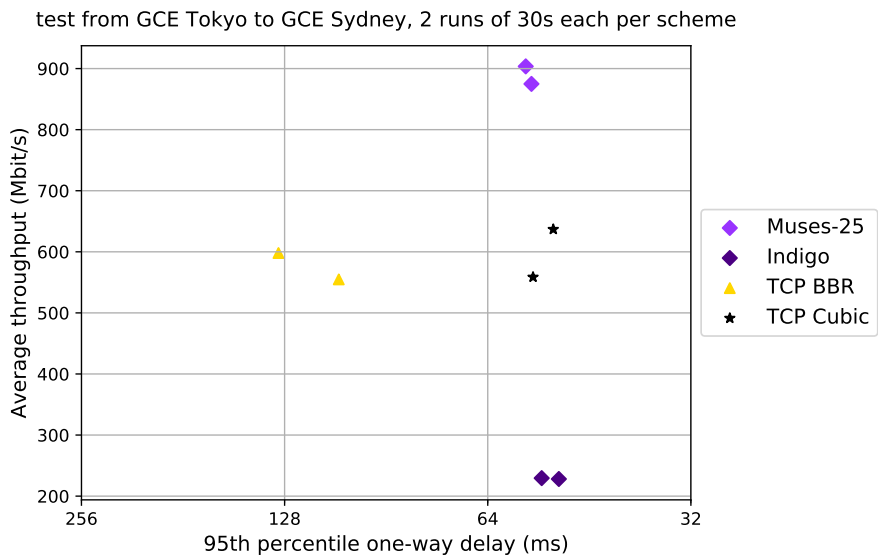
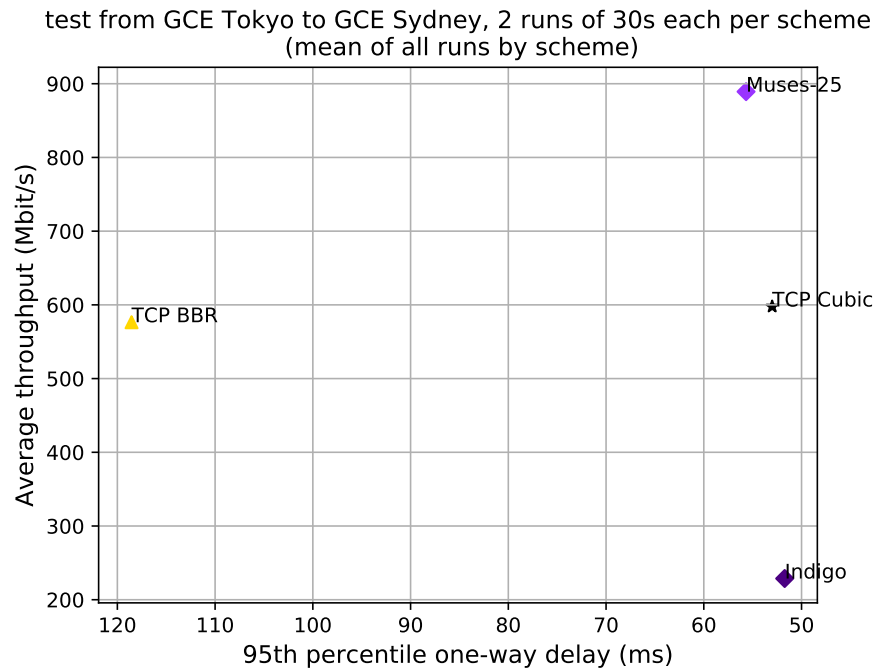
NTP offsets were measured against `time.google.com` and have been applied to correct the timestamps in logs.

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 @ d0153f8e594aa89e93b032143cedbdf58e562f4
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
```



scheme	# runs	mean avg tput (Mbit/s) flow 1	mean 95th-%ile delay (ms) flow 1	mean loss rate (%) flow 1
TCP BBR	2	576.45	118.55	0.59
TCP Cubic	2	597.74	53.00	0.41
Indigo	2	228.76	51.73	0.34
Muses-25	2	889.25	55.68	0.38

Run 1: Statistics of TCP BBR

Start at: 2018-09-03 13:20:04

End at: 2018-09-03 13:20:34

Local clock offset: -0.132 ms

Remote clock offset: -0.164 ms

Below is generated by plot.py at 2018-09-03 13:36:02

Datalink statistics

-- Total of 1 flow:

Average throughput: 554.85 Mbit/s

95th percentile per-packet one-way delay: 106.397 ms

Loss rate: 0.45%

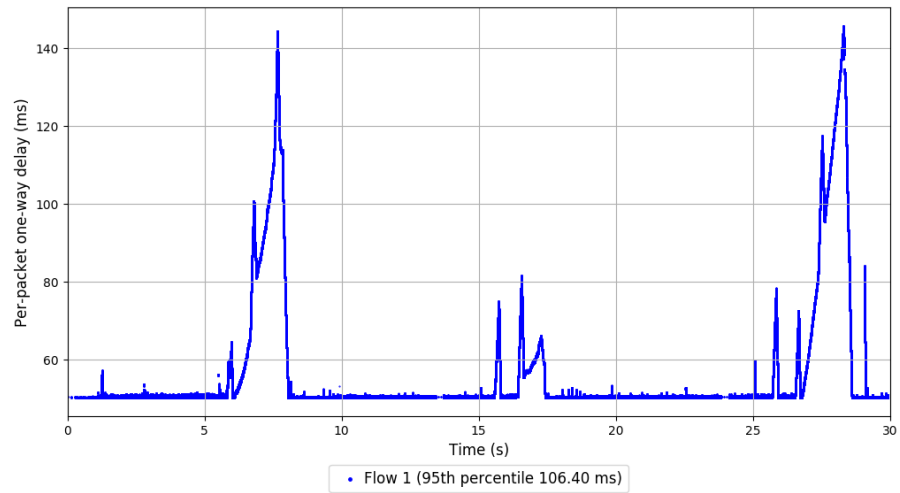
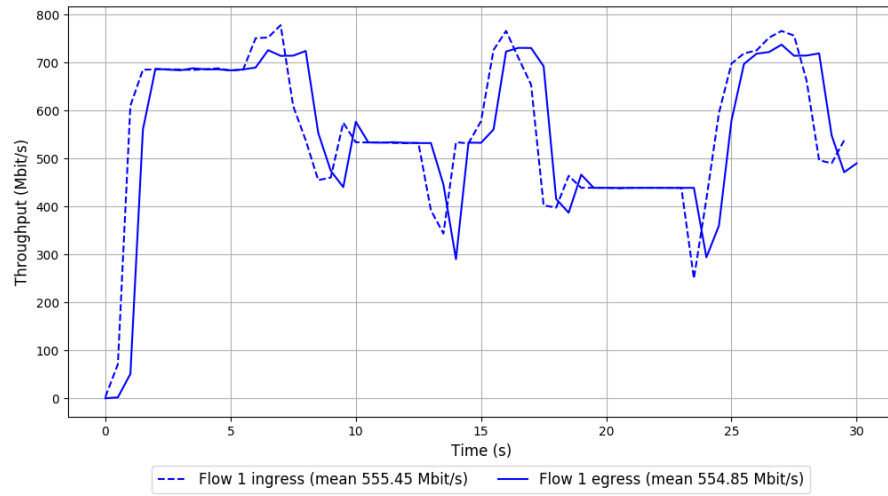
-- Flow 1:

Average throughput: 554.85 Mbit/s

95th percentile per-packet one-way delay: 106.397 ms

Loss rate: 0.45%

Run 1: Report of TCP BBR — Data Link

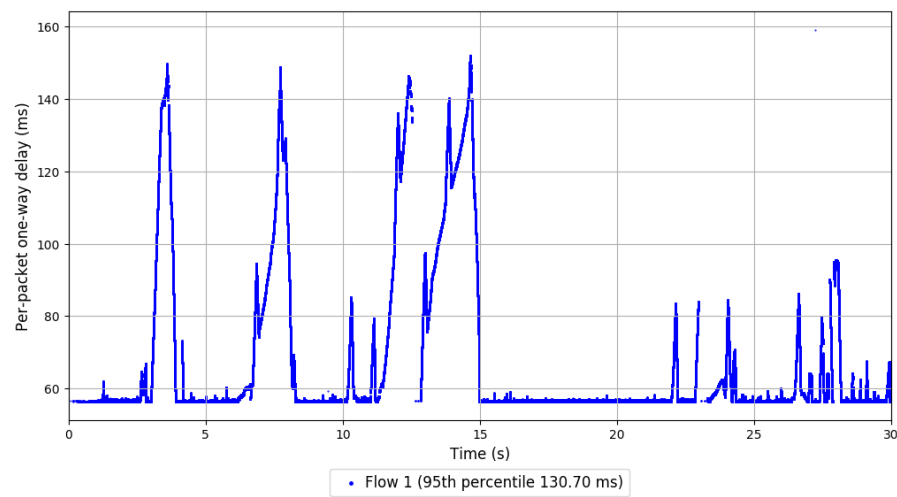
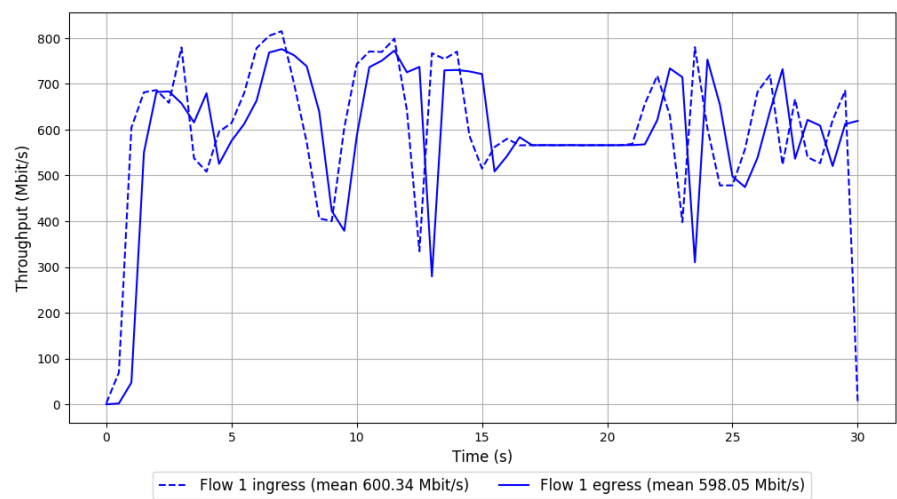


Run 2: Statistics of TCP BBR

Start at: 2018-09-03 13:26:15
End at: 2018-09-03 13:26:45
Local clock offset: -0.013 ms
Remote clock offset: -3.004 ms

Below is generated by plot.py at 2018-09-03 13:36:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 598.05 Mbit/s
95th percentile per-packet one-way delay: 130.699 ms
Loss rate: 0.73%
-- Flow 1:
Average throughput: 598.05 Mbit/s
95th percentile per-packet one-way delay: 130.699 ms
Loss rate: 0.73%

Run 2: Report of TCP BBR — Data Link

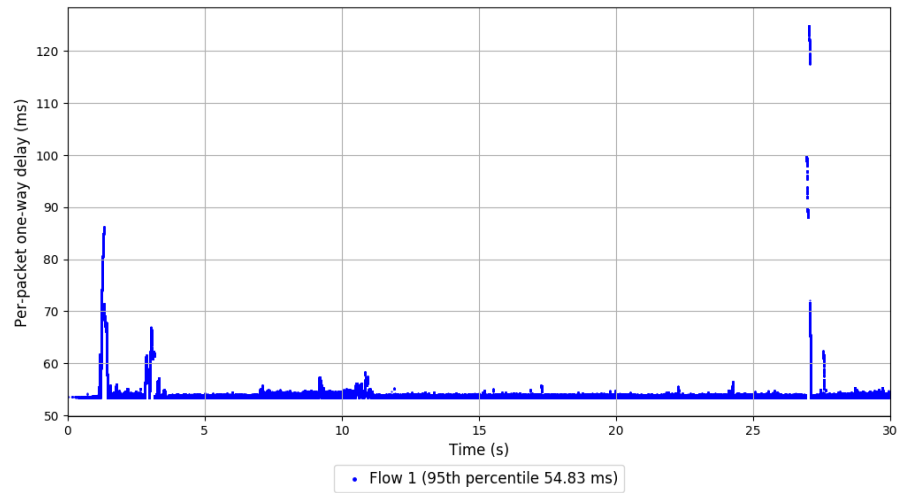
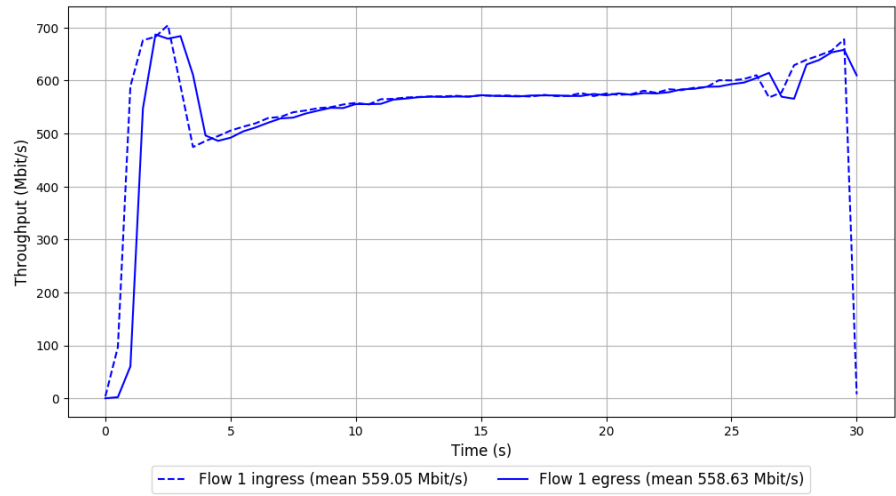


Run 1: Statistics of TCP Cubic

Start at: 2018-09-03 13:16:53
End at: 2018-09-03 13:17:24
Local clock offset: -0.103 ms
Remote clock offset: -0.138 ms

Below is generated by plot.py at 2018-09-03 13:36:15
Datalink statistics
-- Total of 1 flow:
Average throughput: 558.63 Mbit/s
95th percentile per-packet one-way delay: 54.834 ms
Loss rate: 0.42%
-- Flow 1:
Average throughput: 558.63 Mbit/s
95th percentile per-packet one-way delay: 54.834 ms
Loss rate: 0.42%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-09-03 13:23:01

End at: 2018-09-03 13:23:31

Local clock offset: -0.1 ms

Remote clock offset: 2.912 ms

Below is generated by plot.py at 2018-09-03 13:36:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 636.85 Mbit/s

95th percentile per-packet one-way delay: 51.175 ms

Loss rate: 0.39%

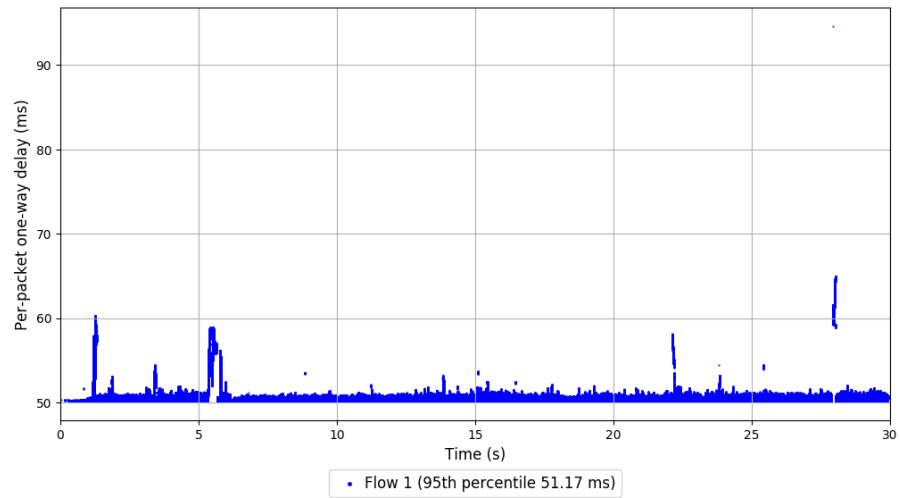
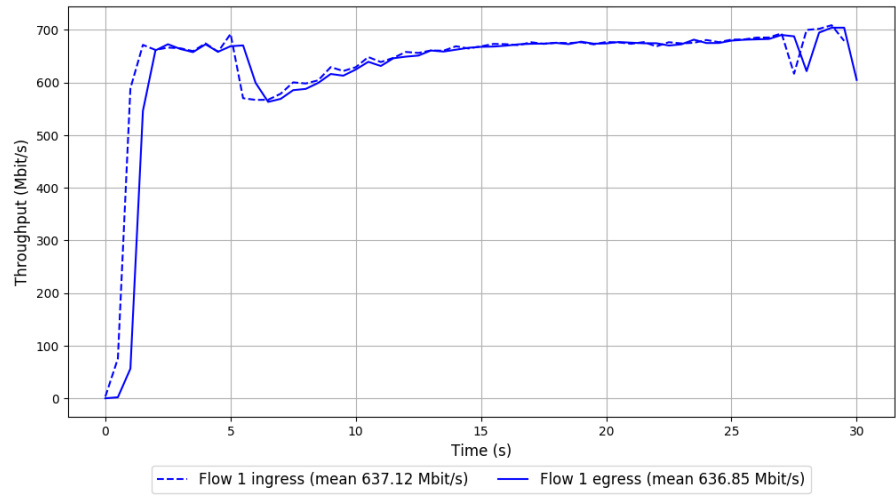
-- Flow 1:

Average throughput: 636.85 Mbit/s

95th percentile per-packet one-way delay: 51.175 ms

Loss rate: 0.39%

Run 2: Report of TCP Cubic — Data Link



Run 1: Statistics of Indigo

Start at: 2018-09-03 13:15:28

End at: 2018-09-03 13:15:58

Local clock offset: 0.032 ms

Remote clock offset: -2.992 ms

Below is generated by plot.py at 2018-09-03 13:36:20

Datalink statistics

-- Total of 1 flow:

Average throughput: 229.48 Mbit/s

95th percentile per-packet one-way delay: 53.240 ms

Loss rate: 0.33%

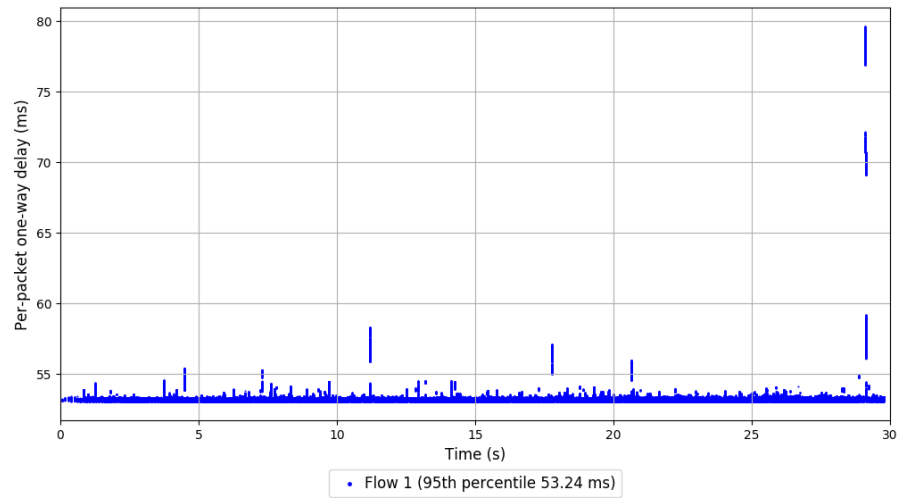
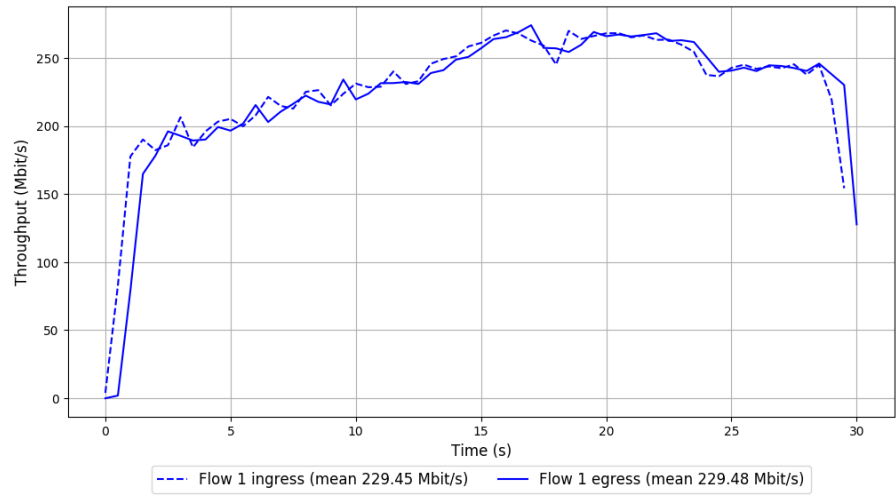
-- Flow 1:

Average throughput: 229.48 Mbit/s

95th percentile per-packet one-way delay: 53.240 ms

Loss rate: 0.33%

Run 1: Report of Indigo — Data Link

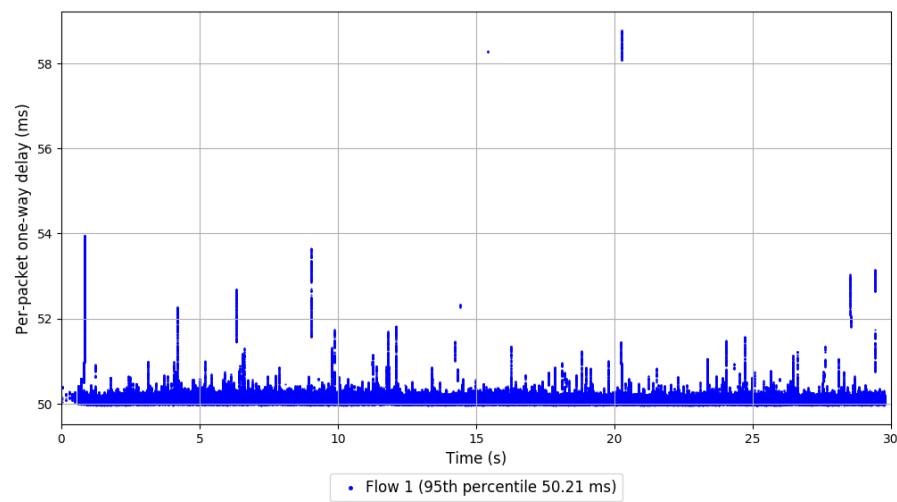
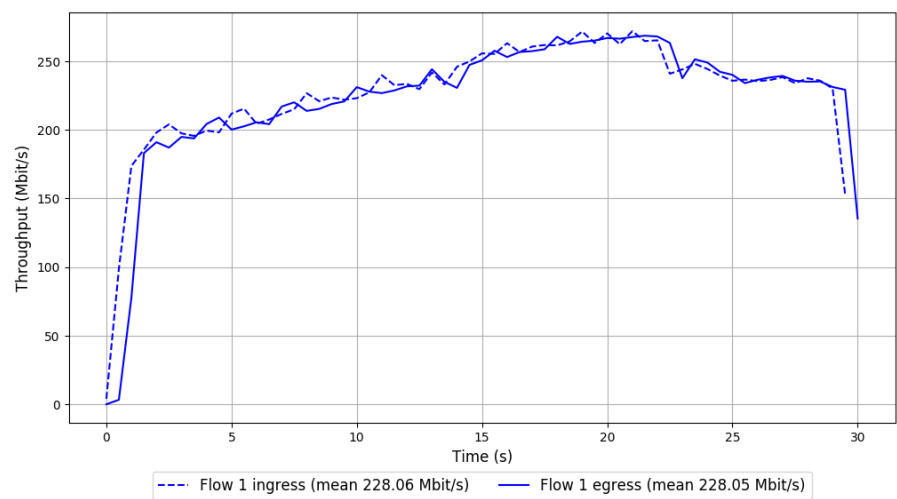


Run 2: Statistics of Indigo

Start at: 2018-09-03 13:21:36
End at: 2018-09-03 13:22:06
Local clock offset: -0.311 ms
Remote clock offset: -0.219 ms

Below is generated by plot.py at 2018-09-03 13:36:20
Datalink statistics
-- Total of 1 flow:
Average throughput: 228.05 Mbit/s
95th percentile per-packet one-way delay: 50.211 ms
Loss rate: 0.34%
-- Flow 1:
Average throughput: 228.05 Mbit/s
95th percentile per-packet one-way delay: 50.211 ms
Loss rate: 0.34%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-09-03 13:18:25

End at: 2018-09-03 13:18:55

Local clock offset: -0.241 ms

Remote clock offset: -0.18 ms

Below is generated by plot.py at 2018-09-03 13:37:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 903.60 Mbit/s

95th percentile per-packet one-way delay: 56.218 ms

Loss rate: 0.37%

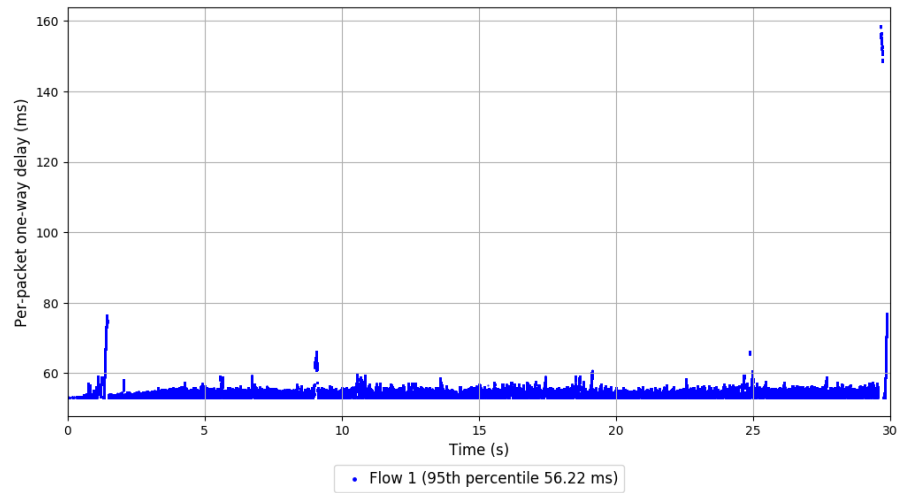
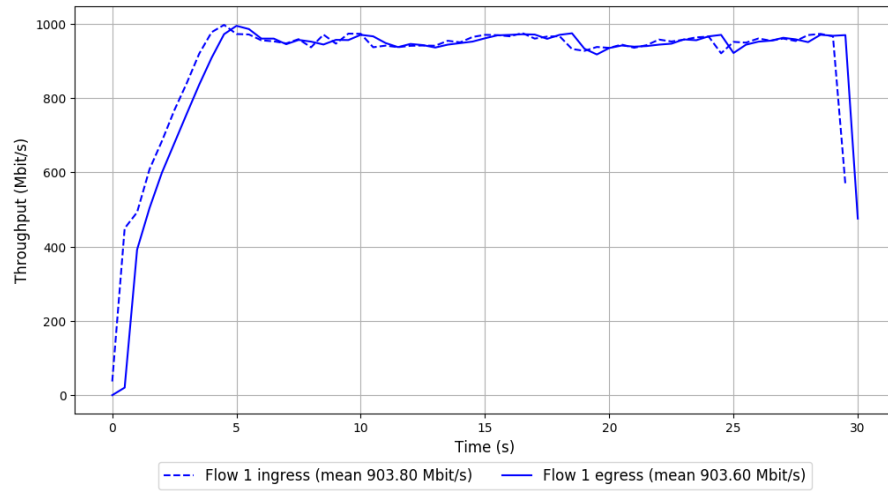
-- Flow 1:

Average throughput: 903.60 Mbit/s

95th percentile per-packet one-way delay: 56.218 ms

Loss rate: 0.37%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-09-03 13:24:36

End at: 2018-09-03 13:25:06

Local clock offset: 0.047 ms

Remote clock offset: 2.739 ms

Below is generated by plot.py at 2018-09-03 13:37:32

Datalink statistics

-- Total of 1 flow:

Average throughput: 874.90 Mbit/s

95th percentile per-packet one-way delay: 55.133 ms

Loss rate: 0.39%

-- Flow 1:

Average throughput: 874.90 Mbit/s

95th percentile per-packet one-way delay: 55.133 ms

Loss rate: 0.39%

Run 2: Report of Muses-25 — Data Link

