

Pantheon Report

Generated at 2018-08-31 11:42:06 (UTC).

Data path: GCE London 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.

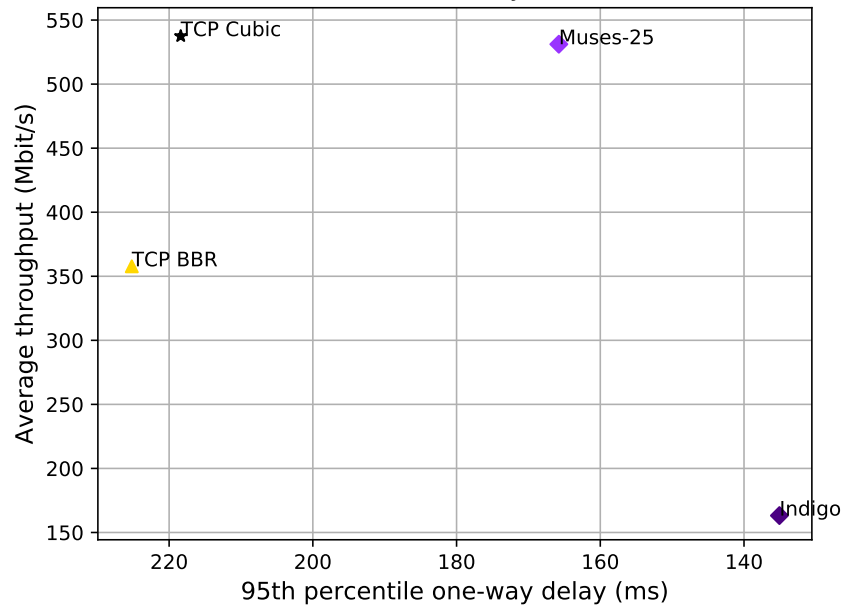
System info:

```
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
```

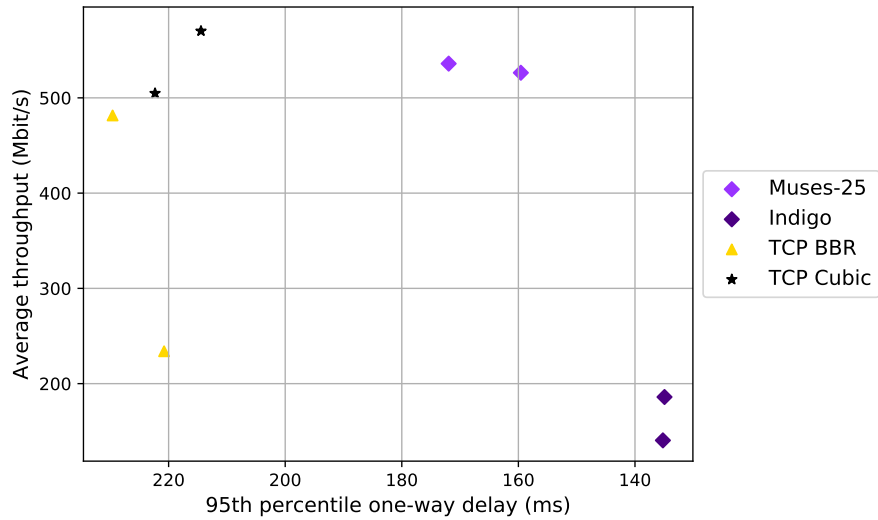
Git summary:

```
branch: muses @ e3c5aa19ca94c3066828fb83f16a8fb6b2731e7a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b59e0d118c50af3579569c462d33045741c85981
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
```

test from GCE London to GCE Sydney, 2 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE London to GCE Sydney, 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	357.77	225.19	2.22
TCP Cubic	2	537.46	218.39	1.27
Indigo	2	163.20	135.07	0.94
Muses-25	2	531.14	165.77	0.57

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 11:26:21

End at: 2018-08-31 11:26:51

Local clock offset: 0.809 ms

Remote clock offset: -0.135 ms

Below is generated by plot.py at 2018-08-31 11:37:46

Datalink statistics

-- Total of 1 flow:

Average throughput: 234.00 Mbit/s

95th percentile per-packet one-way delay: 220.777 ms

Loss rate: 2.38%

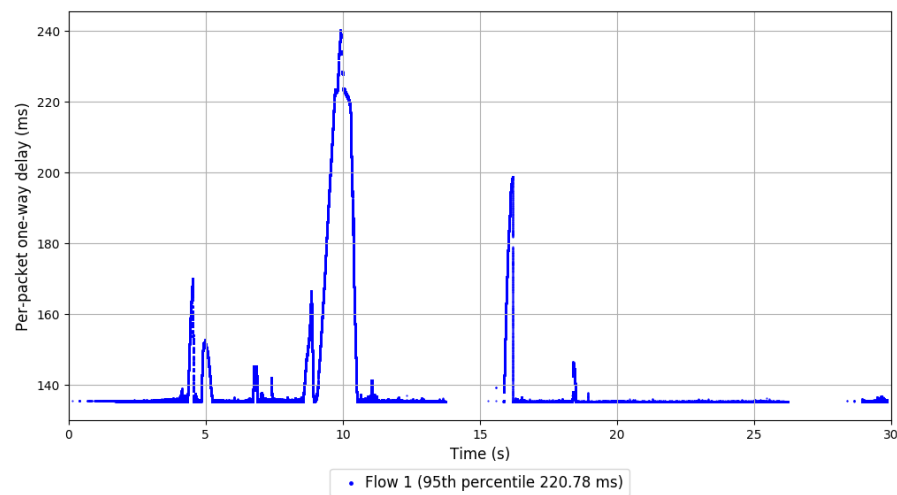
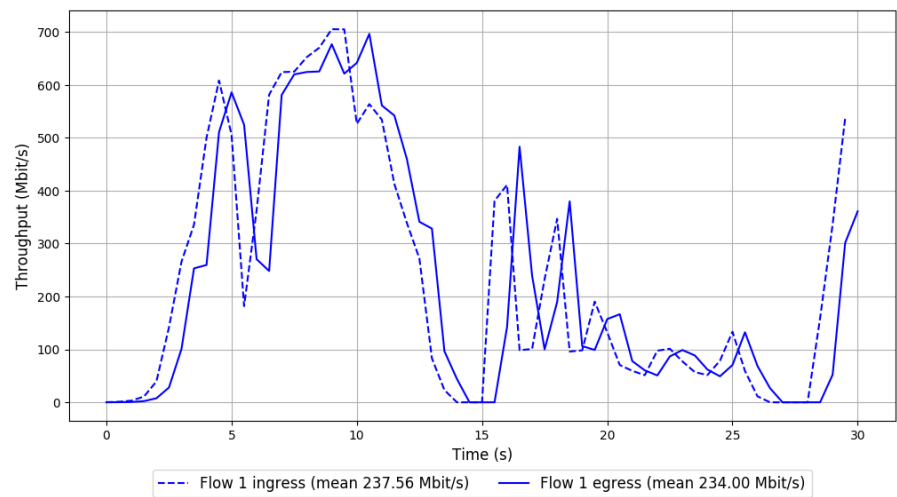
-- Flow 1:

Average throughput: 234.00 Mbit/s

95th percentile per-packet one-way delay: 220.777 ms

Loss rate: 2.38%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-31 11:32:33

End at: 2018-08-31 11:33:04

Local clock offset: 0.676 ms

Remote clock offset: 0.492 ms

Below is generated by plot.py at 2018-08-31 11:40:42

Datalink statistics

-- Total of 1 flow:

Average throughput: 481.55 Mbit/s

95th percentile per-packet one-way delay: 229.609 ms

Loss rate: 2.06%

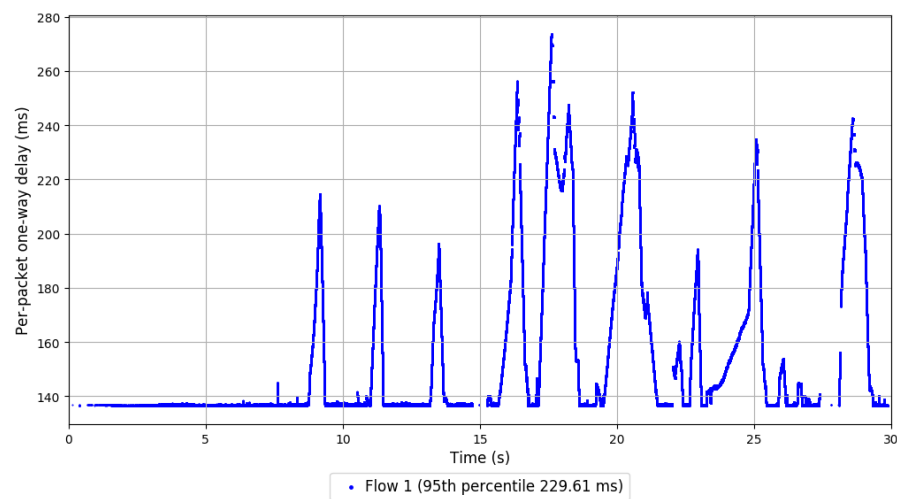
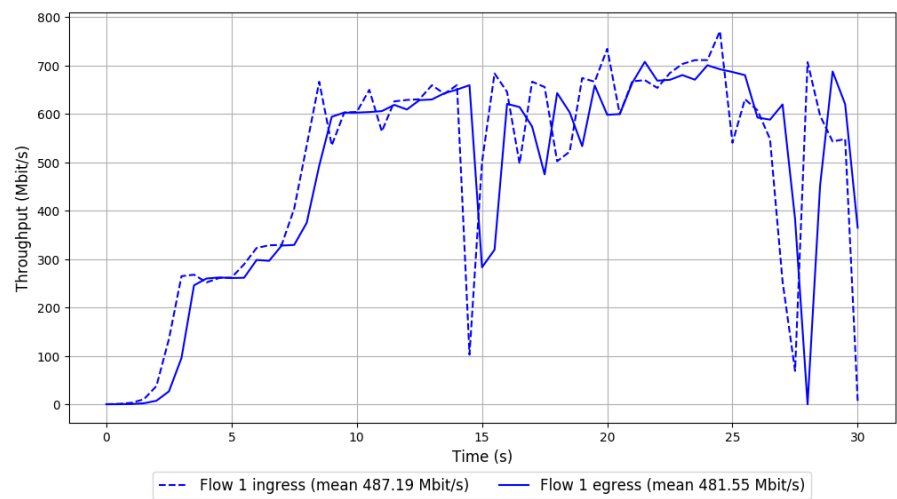
-- Flow 1:

Average throughput: 481.55 Mbit/s

95th percentile per-packet one-way delay: 229.609 ms

Loss rate: 2.06%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 11:24:44

End at: 2018-08-31 11:25:14

Local clock offset: 0.764 ms

Remote clock offset: 0.811 ms

Below is generated by plot.py at 2018-08-31 11:40:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 504.77 Mbit/s

95th percentile per-packet one-way delay: 222.325 ms

Loss rate: 1.36%

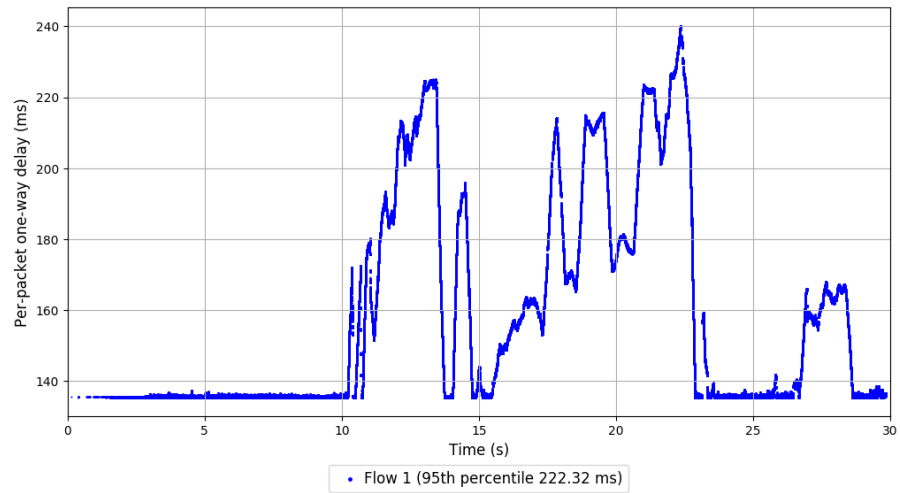
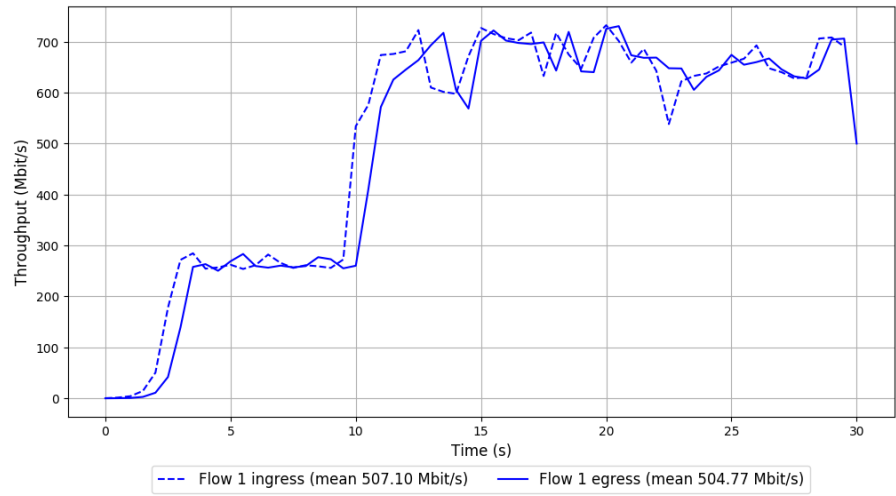
-- Flow 1:

Average throughput: 504.77 Mbit/s

95th percentile per-packet one-way delay: 222.325 ms

Loss rate: 1.36%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 11:30:53

End at: 2018-08-31 11:31:23

Local clock offset: 0.639 ms

Remote clock offset: 0.531 ms

Below is generated by plot.py at 2018-08-31 11:41:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 570.16 Mbit/s

95th percentile per-packet one-way delay: 214.448 ms

Loss rate: 1.18%

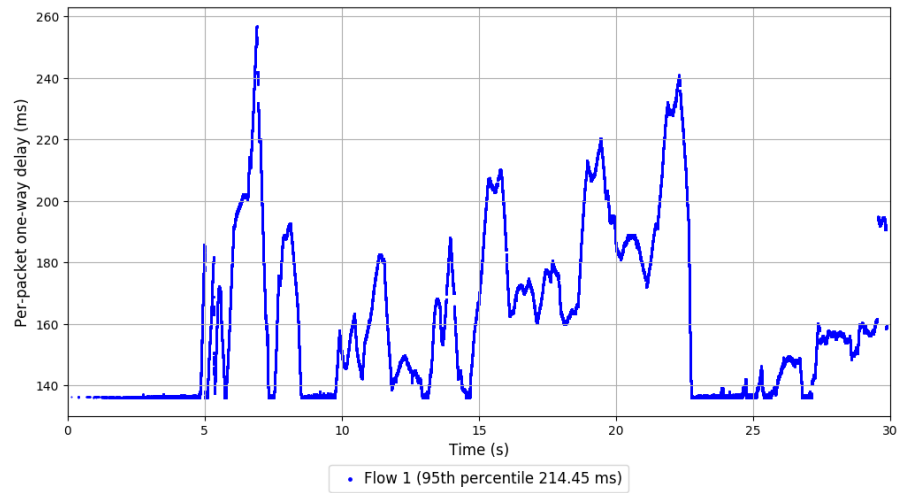
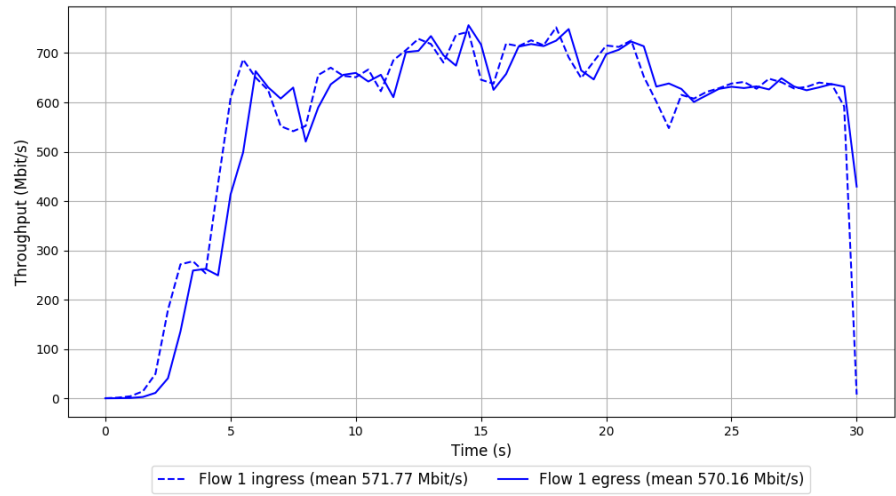
-- Flow 1:

Average throughput: 570.16 Mbit/s

95th percentile per-packet one-way delay: 214.448 ms

Loss rate: 1.18%

Run 2: Report of TCP Cubic — Data Link

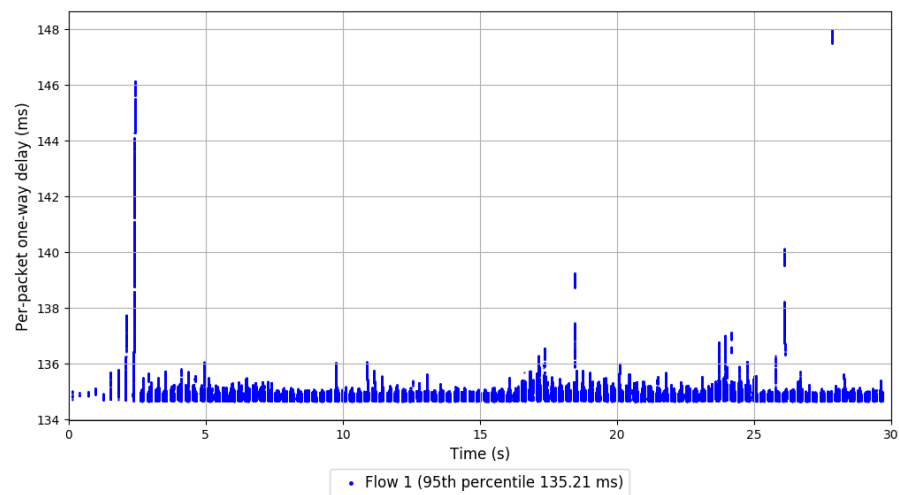
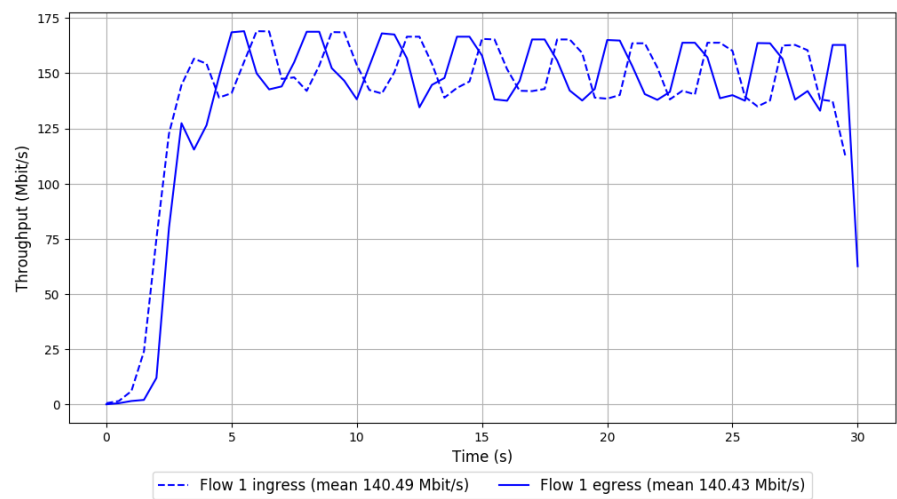


```
Run 1: Statistics of Indigo

Start at: 2018-08-31 11:23:20
End at: 2018-08-31 11:23:50
Local clock offset: 0.879 ms
Remote clock offset: 0.503 ms

# Below is generated by plot.py at 2018-08-31 11:41:50
# Datalink statistics
-- Total of 1 flow:
Average throughput: 140.43 Mbit/s
95th percentile per-packet one-way delay: 135.211 ms
Loss rate: 0.94%
-- Flow 1:
Average throughput: 140.43 Mbit/s
95th percentile per-packet one-way delay: 135.211 ms
Loss rate: 0.94%
```

Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-31 11:29:25

End at: 2018-08-31 11:29:55

Local clock offset: 0.73 ms

Remote clock offset: 0.478 ms

Below is generated by plot.py at 2018-08-31 11:41:50

Datalink statistics

-- Total of 1 flow:

Average throughput: 185.97 Mbit/s

95th percentile per-packet one-way delay: 134.935 ms

Loss rate: 0.93%

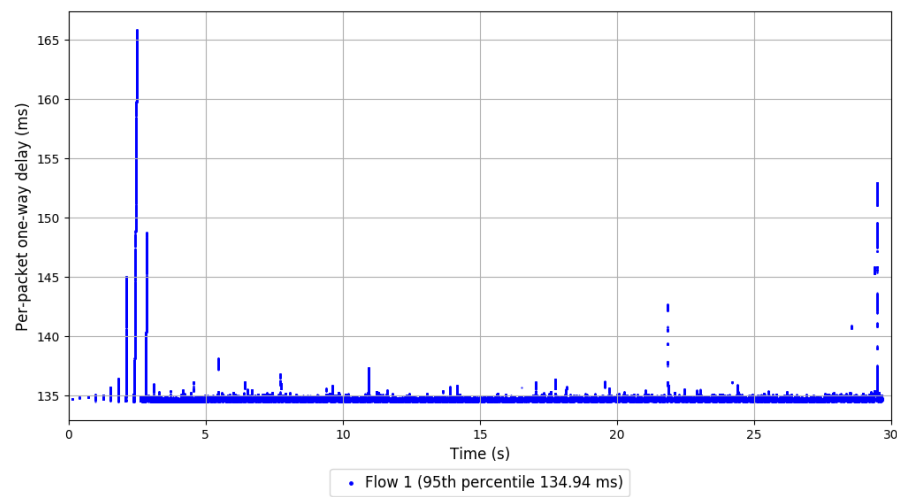
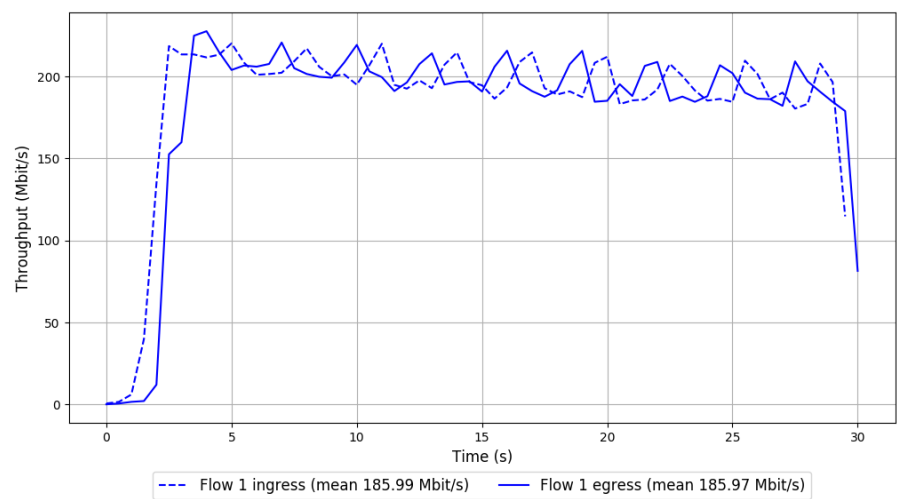
-- Flow 1:

Average throughput: 185.97 Mbit/s

95th percentile per-packet one-way delay: 134.935 ms

Loss rate: 0.93%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-25

Start at: 2018-08-31 11:21:39

End at: 2018-08-31 11:22:09

Local clock offset: 0.985 ms

Remote clock offset: 0.666 ms

Below is generated by plot.py at 2018-08-31 11:42:05

Datalink statistics

-- Total of 1 flow:

Average throughput: 535.94 Mbit/s

95th percentile per-packet one-way delay: 171.959 ms

Loss rate: 0.12%

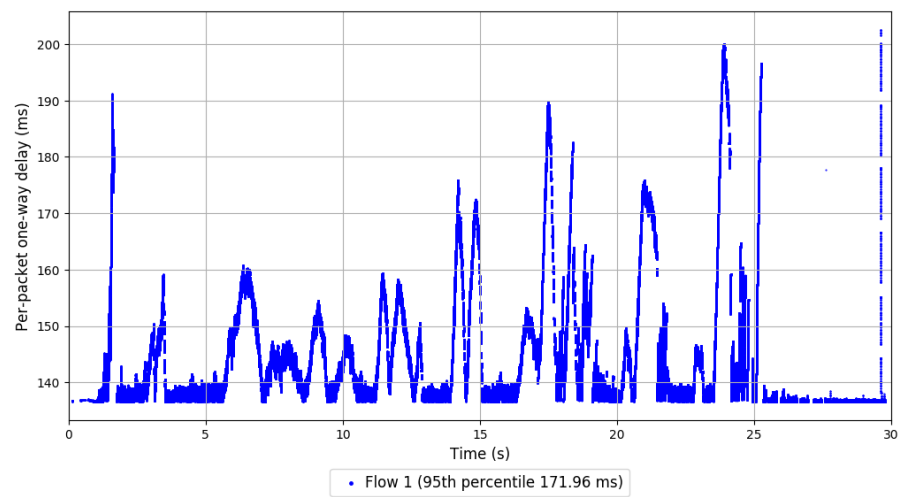
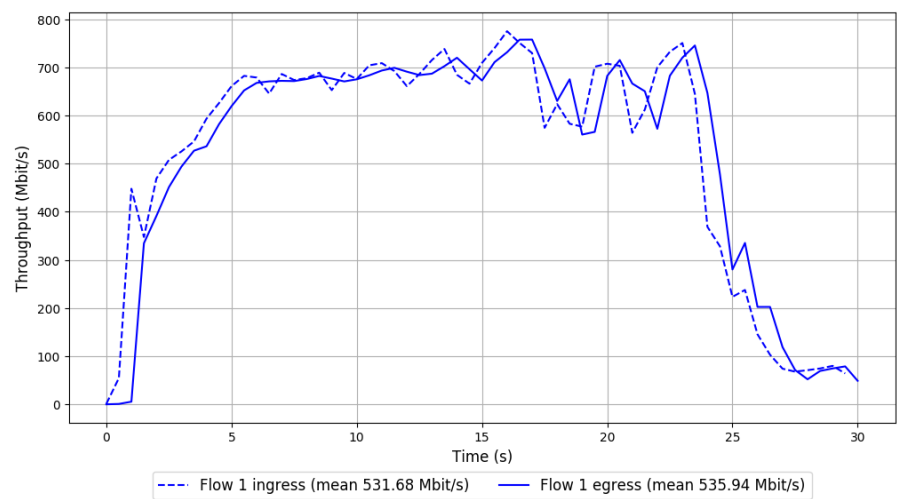
-- Flow 1:

Average throughput: 535.94 Mbit/s

95th percentile per-packet one-way delay: 171.959 ms

Loss rate: 0.12%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-08-31 11:27:45
End at: 2018-08-31 11:28:15
Local clock offset: 0.531 ms
Remote clock offset: -0.158 ms

Below is generated by plot.py at 2018-08-31 11:42:05
Datalink statistics
-- Total of 1 flow:
Average throughput: 526.35 Mbit/s
95th percentile per-packet one-way delay: 159.577 ms
Loss rate: 1.02%
-- Flow 1:
Average throughput: 526.35 Mbit/s
95th percentile per-packet one-way delay: 159.577 ms
Loss rate: 1.02%

Run 2: Report of Muses-25 — Data Link

