

Pantheon Report

Generated at 2018-08-28 09:24:23 (UTC).

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

Repeated the test of 4 congestion control schemes 3 times.

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.

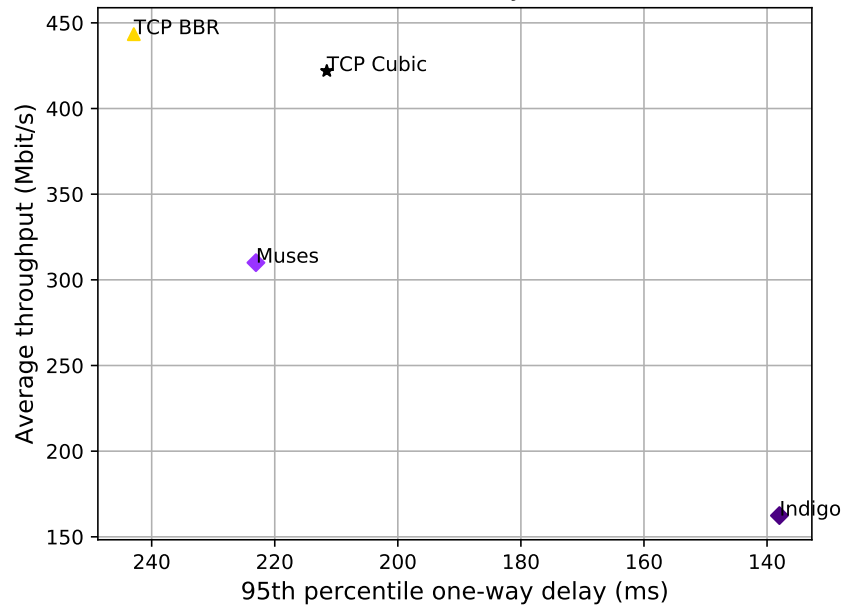
System info:

```
Linux 4.15.0-1015-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
```

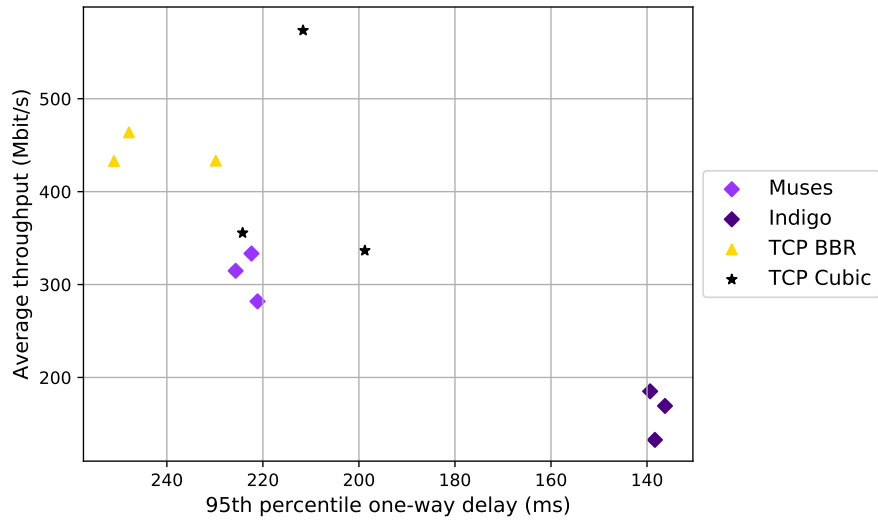
Git summary:

```
branch: muses @ 86ef433b09b2f4ecae1186d6940af93bcf0969cd
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecdbf90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b261c9e99c63be452bc16f94ce0caa99a4c9d39a
third_party/pantheon-tunnel @ cbfce6db5ff5740dafe1771f813cd646339e1952
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, 3 runs of 30s each per scheme
(mean of all runs by scheme)



test from GCE London to GCE Sydney, 3 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	3	443.40	242.90	2.83
TCP Cubic	3	421.90	211.54	1.54
Indigo	3	162.40	137.99	0.91
Muses	3	310.02	223.06	5.19

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 08:56:54

End at: 2018-08-28 08:57:24

Local clock offset: -0.136 ms

Remote clock offset: -0.085 ms

Below is generated by plot.py at 2018-08-28 09:21:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 433.35 Mbit/s

95th percentile per-packet one-way delay: 229.807 ms

Loss rate: 1.89%

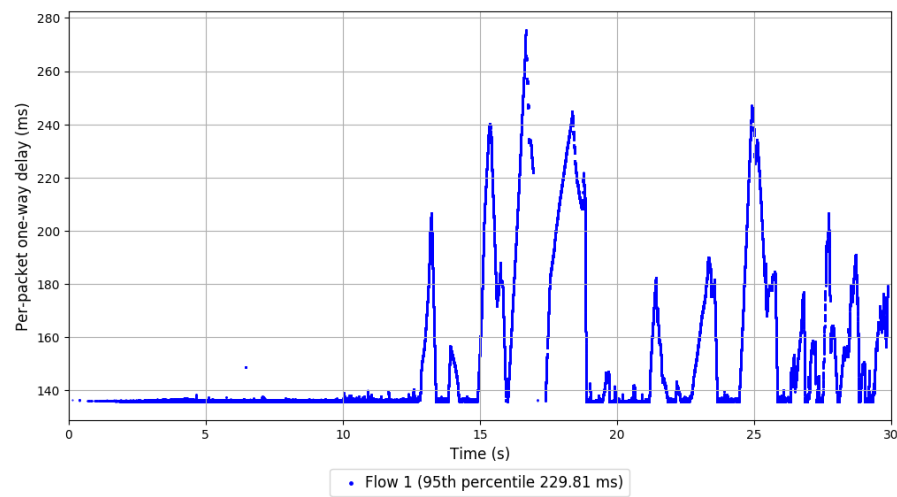
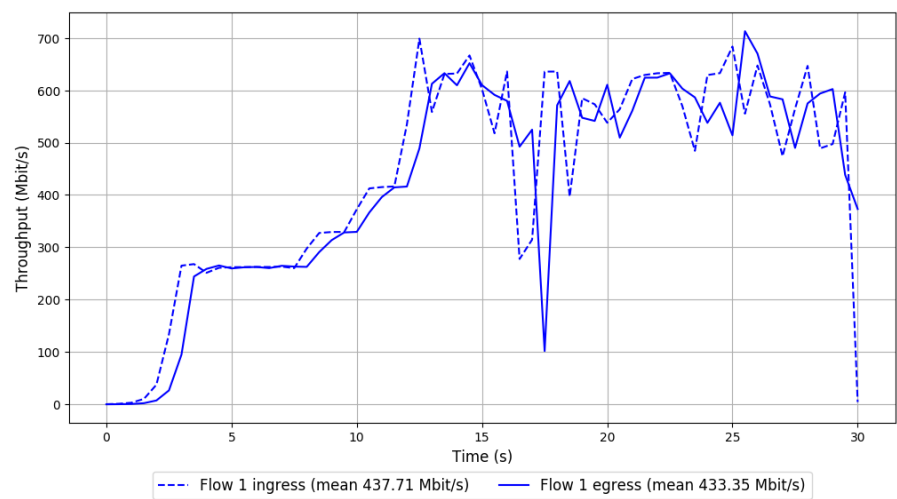
-- Flow 1:

Average throughput: 433.35 Mbit/s

95th percentile per-packet one-way delay: 229.807 ms

Loss rate: 1.89%

Run 1: Report of TCP BBR — Data Link



Run 2: Statistics of TCP BBR

Start at: 2018-08-28 09:02:55

End at: 2018-08-28 09:03:25

Local clock offset: -0.059 ms

Remote clock offset: -0.47 ms

Below is generated by plot.py at 2018-08-28 09:21:54

Datalink statistics

-- Total of 1 flow:

Average throughput: 433.03 Mbit/s

95th percentile per-packet one-way delay: 251.007 ms

Loss rate: 3.14%

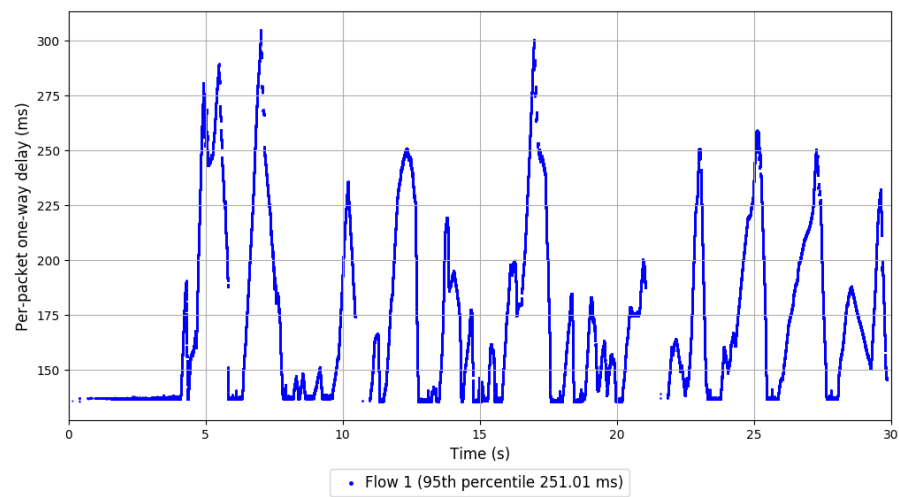
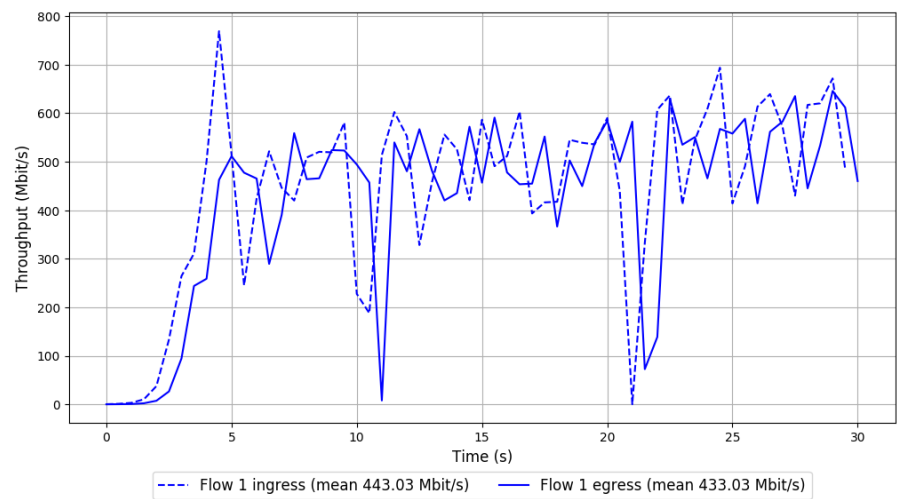
-- Flow 1:

Average throughput: 433.03 Mbit/s

95th percentile per-packet one-way delay: 251.007 ms

Loss rate: 3.14%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-28 09:09:00

End at: 2018-08-28 09:09:30

Local clock offset: -0.096 ms

Remote clock offset: 0.627 ms

Below is generated by plot.py at 2018-08-28 09:22:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 463.82 Mbit/s

95th percentile per-packet one-way delay: 247.892 ms

Loss rate: 3.46%

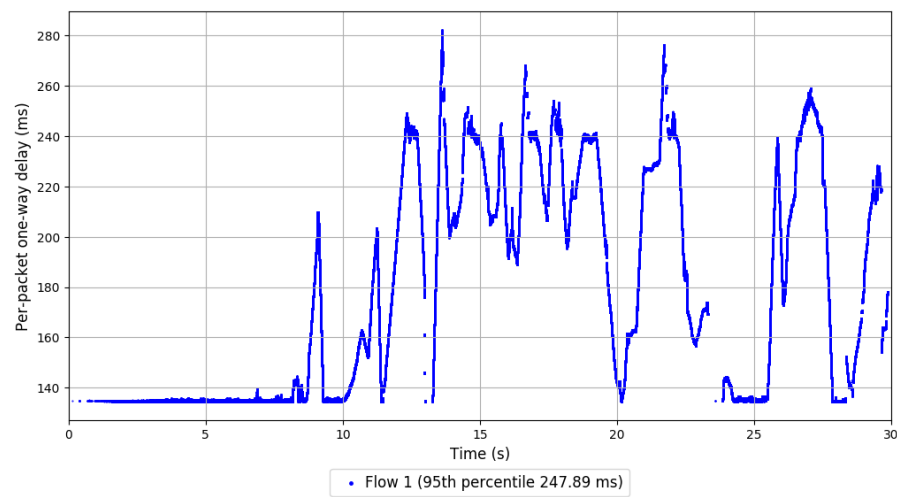
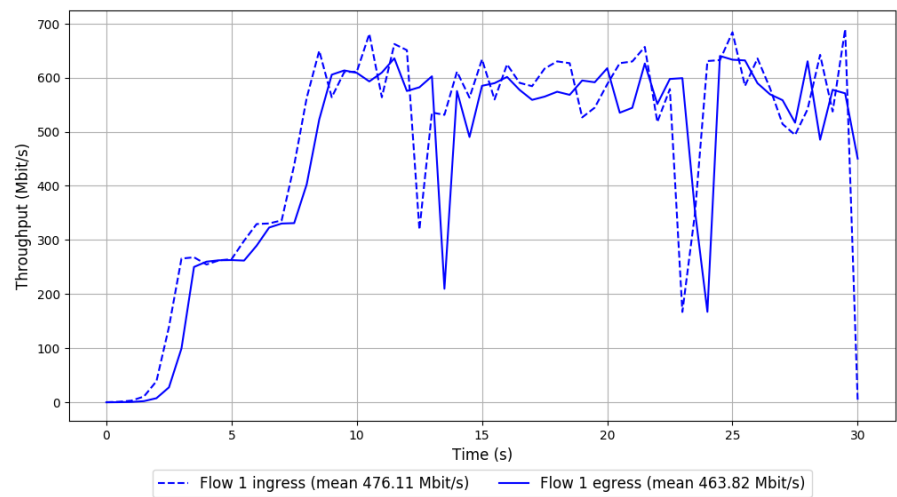
-- Flow 1:

Average throughput: 463.82 Mbit/s

95th percentile per-packet one-way delay: 247.892 ms

Loss rate: 3.46%

Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 08:59:56

End at: 2018-08-28 09:00:26

Local clock offset: -0.262 ms

Remote clock offset: -0.7 ms

Below is generated by plot.py at 2018-08-28 09:22:12

Datalink statistics

-- Total of 1 flow:

Average throughput: 336.54 Mbit/s

95th percentile per-packet one-way delay: 198.769 ms

Loss rate: 1.76%

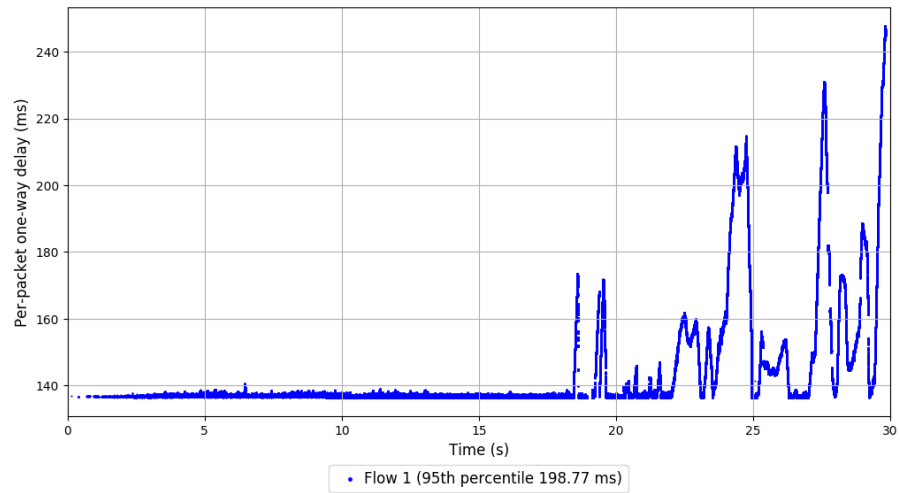
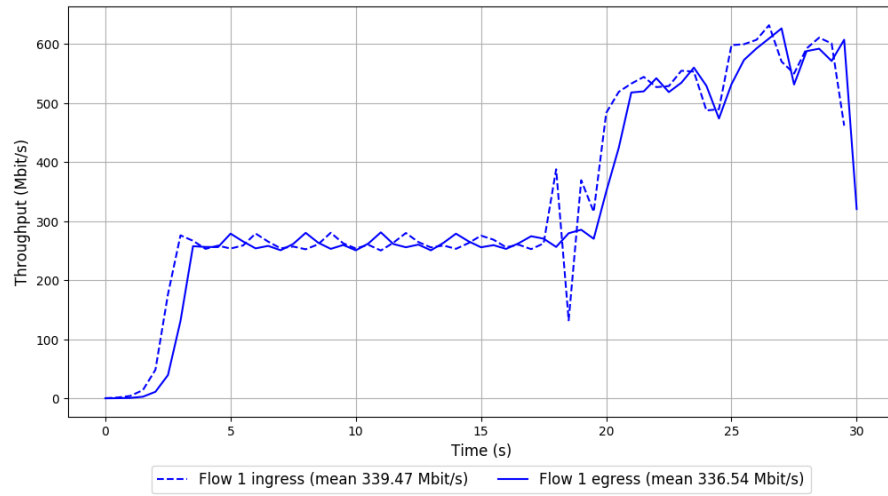
-- Flow 1:

Average throughput: 336.54 Mbit/s

95th percentile per-packet one-way delay: 198.769 ms

Loss rate: 1.76%

Run 1: Report of TCP Cubic — Data Link

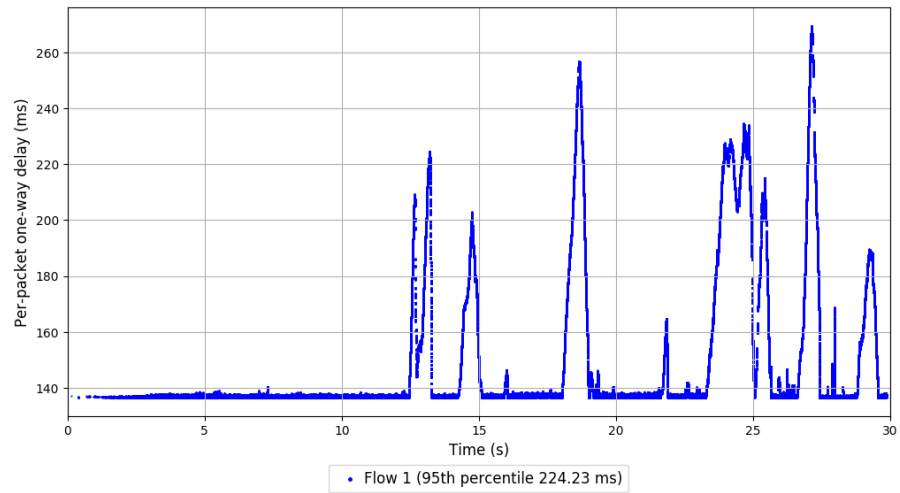
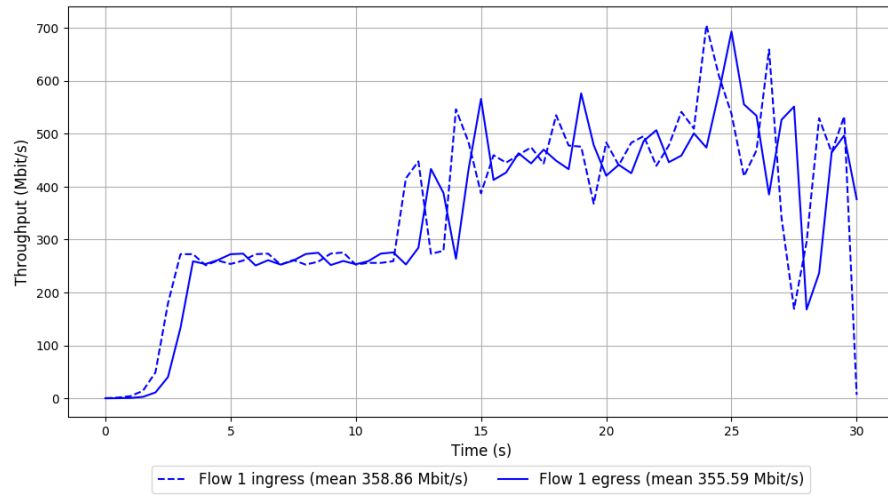


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 09:06:00
End at: 2018-08-28 09:06:30
Local clock offset: -0.163 ms
Remote clock offset: -0.167 ms

Below is generated by plot.py at 2018-08-28 09:22:12
Datalink statistics
-- Total of 1 flow:
Average throughput: 355.59 Mbit/s
95th percentile per-packet one-way delay: 224.229 ms
Loss rate: 1.81%
-- Flow 1:
Average throughput: 355.59 Mbit/s
95th percentile per-packet one-way delay: 224.229 ms
Loss rate: 1.81%

Run 2: Report of TCP Cubic — Data Link



Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 09:12:02

End at: 2018-08-28 09:12:32

Local clock offset: -0.198 ms

Remote clock offset: 0.888 ms

Below is generated by plot.py at 2018-08-28 09:23:00

Datalink statistics

-- Total of 1 flow:

Average throughput: 573.56 Mbit/s

95th percentile per-packet one-way delay: 211.632 ms

Loss rate: 1.04%

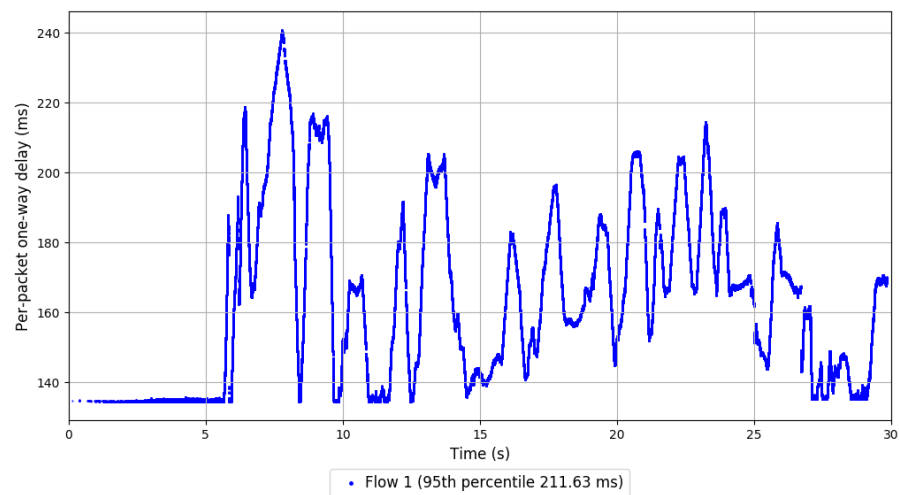
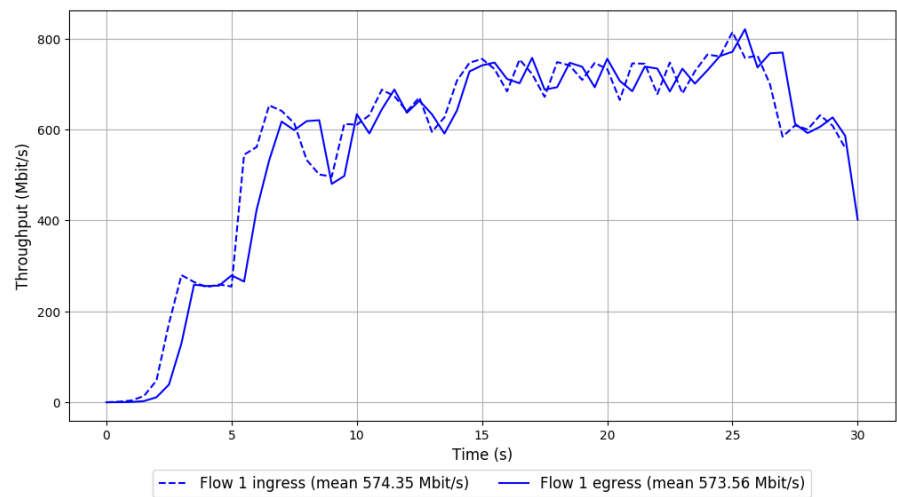
-- Flow 1:

Average throughput: 573.56 Mbit/s

95th percentile per-packet one-way delay: 211.632 ms

Loss rate: 1.04%

Run 3: Report of TCP Cubic — Data Link

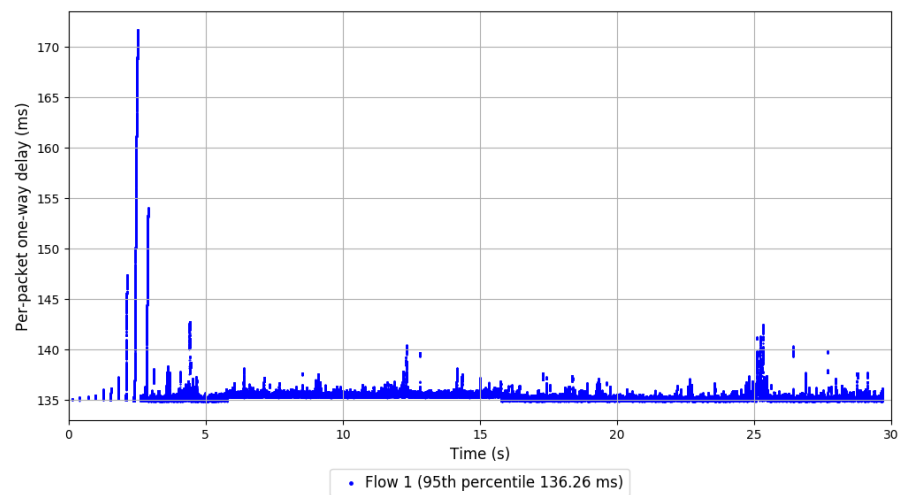
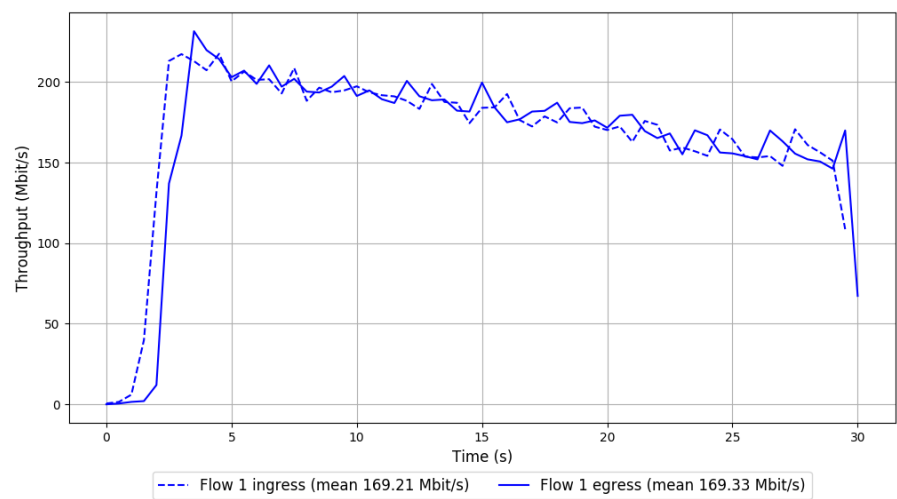


```
Run 1: Statistics of Indigo

Start at: 2018-08-28 08:58:30
End at: 2018-08-28 08:59:00
Local clock offset: -0.254 ms
Remote clock offset: 0.016 ms

# Below is generated by plot.py at 2018-08-28 09:23:00
# Datalink statistics
-- Total of 1 flow:
Average throughput: 169.33 Mbit/s
95th percentile per-packet one-way delay: 136.261 ms
Loss rate: 0.84%
-- Flow 1:
Average throughput: 169.33 Mbit/s
95th percentile per-packet one-way delay: 136.261 ms
Loss rate: 0.84%
```

Run 1: Report of Indigo — Data Link

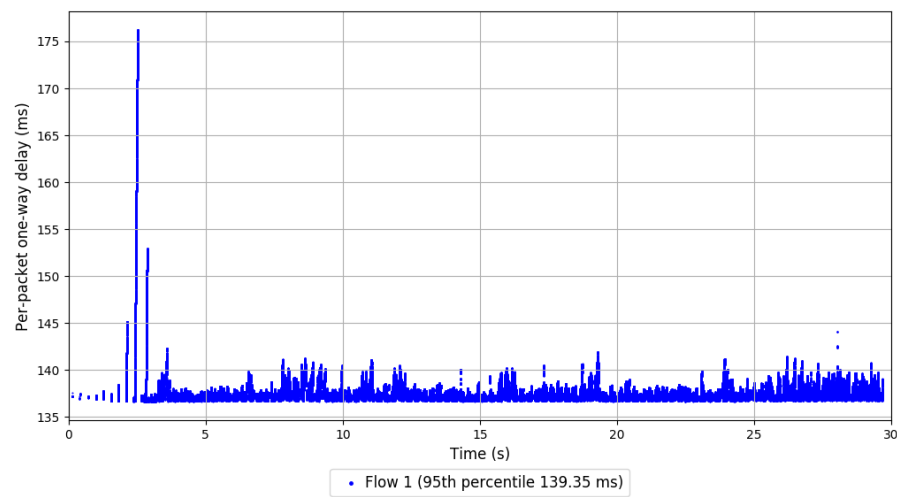
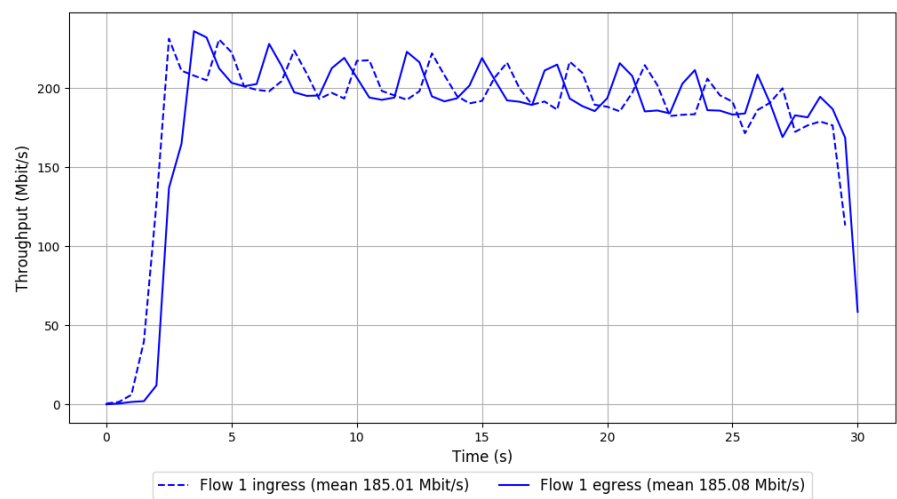


Run 2: Statistics of Indigo

Start at: 2018-08-28 09:04:31
End at: 2018-08-28 09:05:01
Local clock offset: -0.126 ms
Remote clock offset: -0.068 ms

Below is generated by plot.py at 2018-08-28 09:23:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 185.08 Mbit/s
95th percentile per-packet one-way delay: 139.351 ms
Loss rate: 0.88%
-- Flow 1:
Average throughput: 185.08 Mbit/s
95th percentile per-packet one-way delay: 139.351 ms
Loss rate: 0.88%

Run 2: Report of Indigo — Data Link

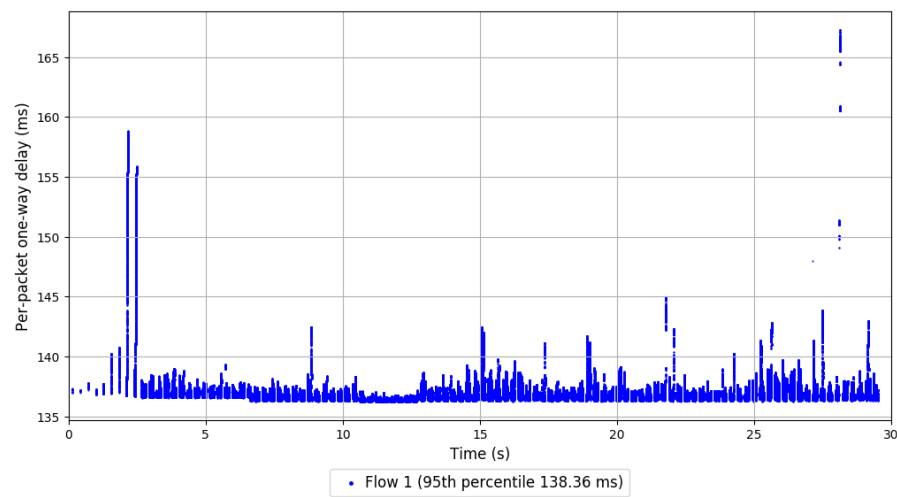
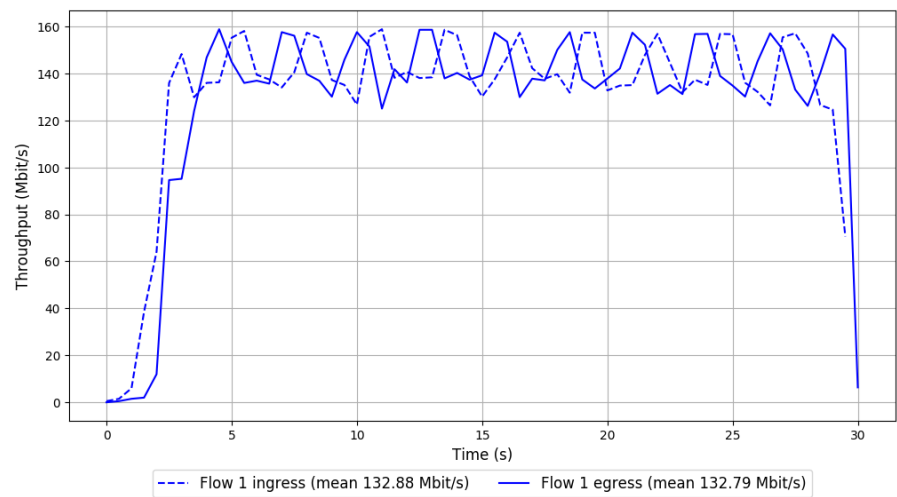


Run 3: Statistics of Indigo

Start at: 2018-08-28 09:10:39
End at: 2018-08-28 09:11:09
Local clock offset: -0.163 ms
Remote clock offset: -0.784 ms

Below is generated by plot.py at 2018-08-28 09:23:00
Datalink statistics
-- Total of 1 flow:
Average throughput: 132.79 Mbit/s
95th percentile per-packet one-way delay: 138.357 ms
Loss rate: 1.00%
-- Flow 1:
Average throughput: 132.79 Mbit/s
95th percentile per-packet one-way delay: 138.357 ms
Loss rate: 1.00%

Run 3: Report of Indigo — Data Link

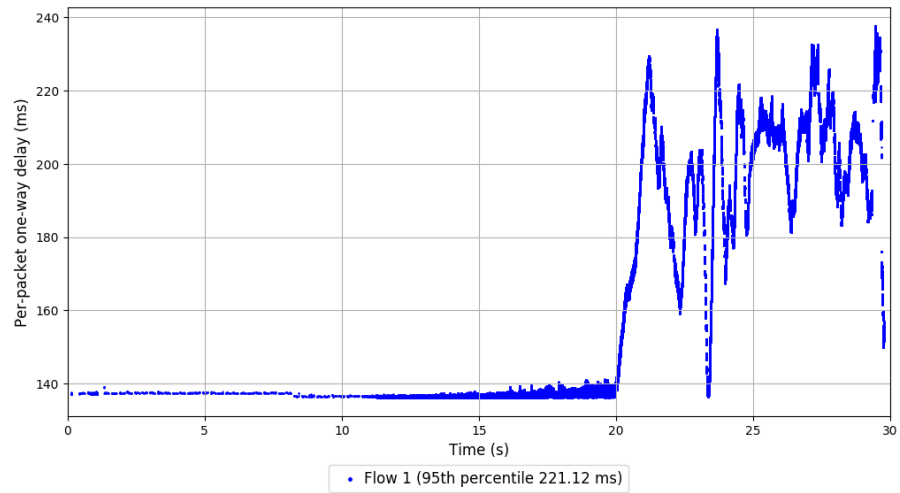
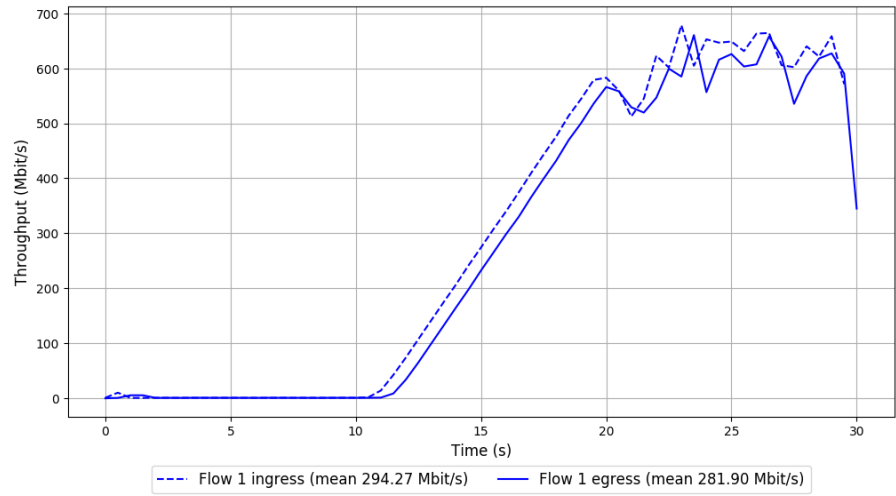


Run 1: Statistics of Muses

Start at: 2018-08-28 08:55:28
End at: 2018-08-28 08:55:58
Local clock offset: -0.011 ms
Remote clock offset: -0.449 ms

Below is generated by plot.py at 2018-08-28 09:24:14
Datalink statistics
-- Total of 1 flow:
Average throughput: 281.90 Mbit/s
95th percentile per-packet one-way delay: 221.121 ms
Loss rate: 5.07%
-- Flow 1:
Average throughput: 281.90 Mbit/s
95th percentile per-packet one-way delay: 221.121 ms
Loss rate: 5.07%

Run 1: Report of Muses — Data Link



Run 2: Statistics of Muses

Start at: 2018-08-28 09:01:25

End at: 2018-08-28 09:01:55

Local clock offset: -0.084 ms

Remote clock offset: 0.989 ms

Below is generated by plot.py at 2018-08-28 09:24:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 333.39 Mbit/s

95th percentile per-packet one-way delay: 222.379 ms

Loss rate: 6.15%

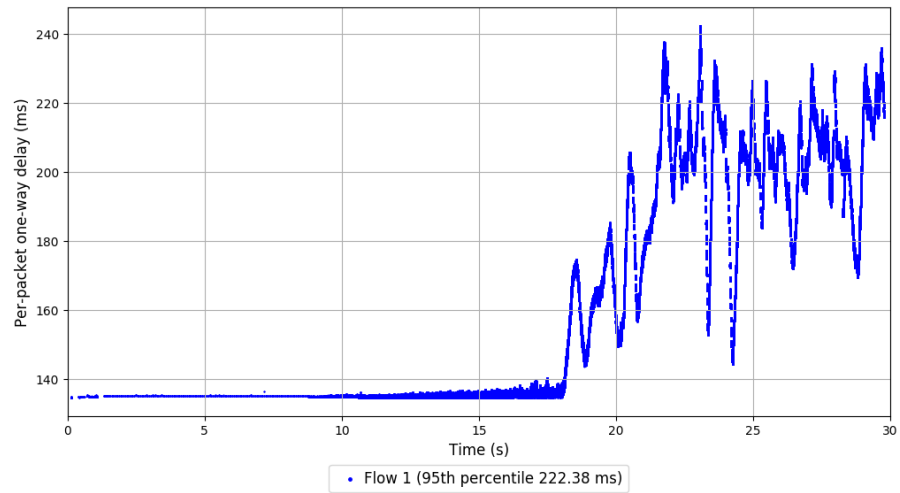
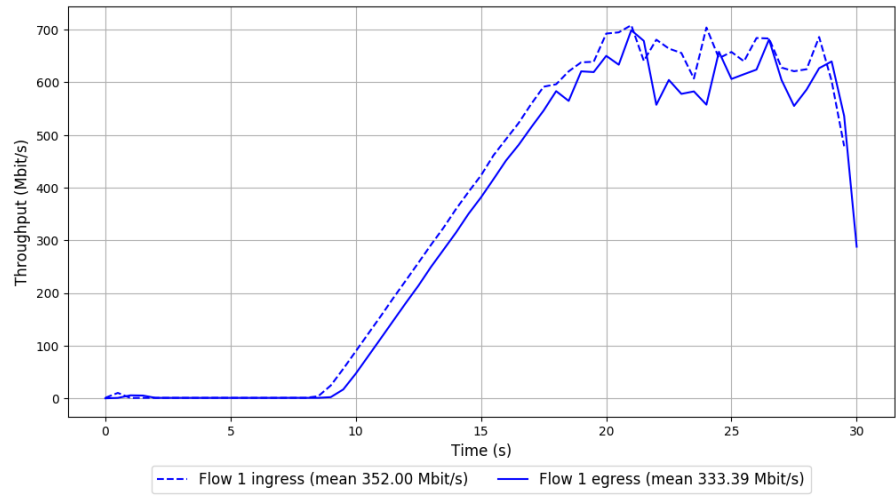
-- Flow 1:

Average throughput: 333.39 Mbit/s

95th percentile per-packet one-way delay: 222.379 ms

Loss rate: 6.15%

Run 2: Report of Muses — Data Link



Run 3: Statistics of Muses

Start at: 2018-08-28 09:07:30

End at: 2018-08-28 09:08:00

Local clock offset: -0.085 ms

Remote clock offset: 0.514 ms

Below is generated by plot.py at 2018-08-28 09:24:22

Datalink statistics

-- Total of 1 flow:

Average throughput: 314.78 Mbit/s

95th percentile per-packet one-way delay: 225.675 ms

Loss rate: 4.36%

-- Flow 1:

Average throughput: 314.78 Mbit/s

95th percentile per-packet one-way delay: 225.675 ms

Loss rate: 4.36%

Run 3: Report of Muses — Data Link

