

## Pantheon Report

Generated at 2018-08-31 13:43:39 (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.

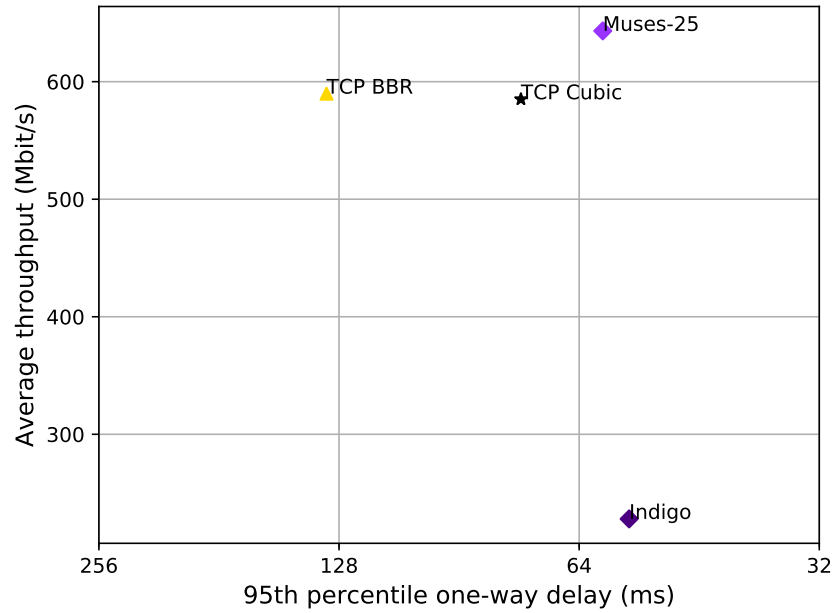
### System info:

```
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
```

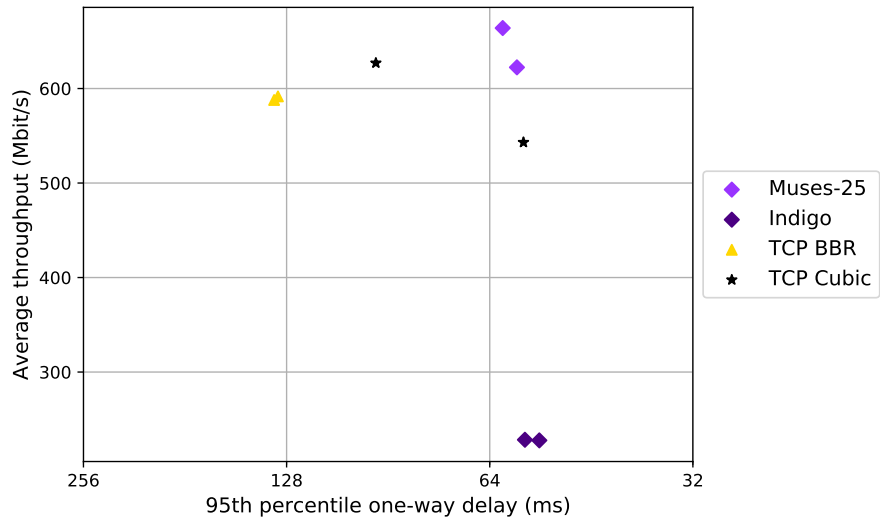
### Git summary:

```
branch: muses @ e3c5aa19ca94c3066828fb83f16a8fb6b2731e7a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
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 Tokyo to GCE Sydney, 2 runs of 30s each per scheme  
(mean of all runs by scheme)



test from GCE Tokyo to GCE Sydney, 2 runs of 30s each per scheme



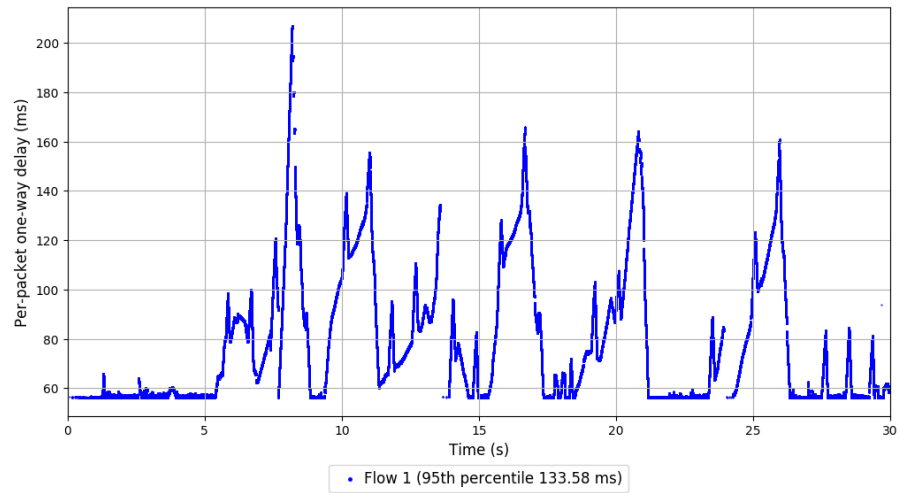
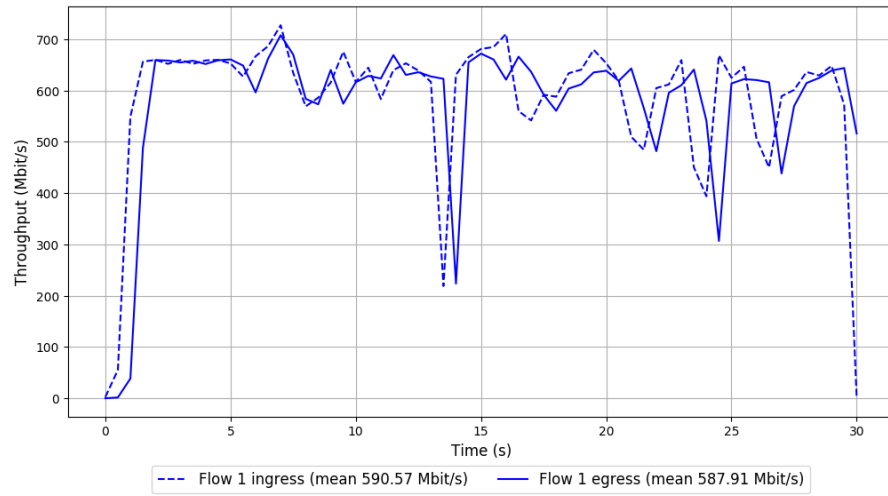
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 2      | 589.81                           | 132.71                              | 0.76                         |
| TCP Cubic | 2      | 585.05                           | 75.72                               | 0.42                         |
| Indigo    | 2      | 228.00                           | 55.40                               | 0.34                         |
| Muses-25  | 2      | 643.19                           | 59.78                               | 0.35                         |

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 13:20:33  
End at: 2018-08-31 13:21:03  
Local clock offset: -0.198 ms  
Remote clock offset: -2.965 ms

# Below is generated by plot.py at 2018-08-31 13:42:09  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 587.91 Mbit/s  
95th percentile per-packet one-way delay: 133.578 ms  
Loss rate: 0.81%  
-- Flow 1:  
Average throughput: 587.91 Mbit/s  
95th percentile per-packet one-way delay: 133.578 ms  
Loss rate: 0.81%

# Run 1: Report of TCP BBR — Data Link

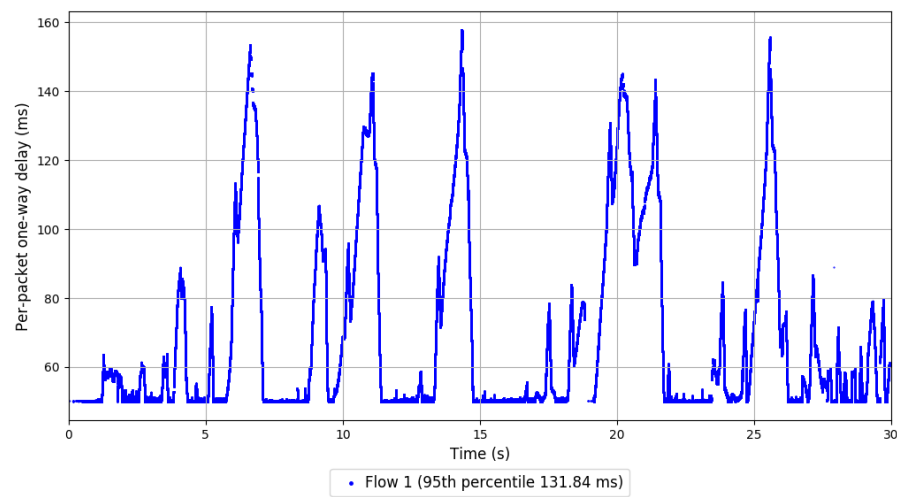
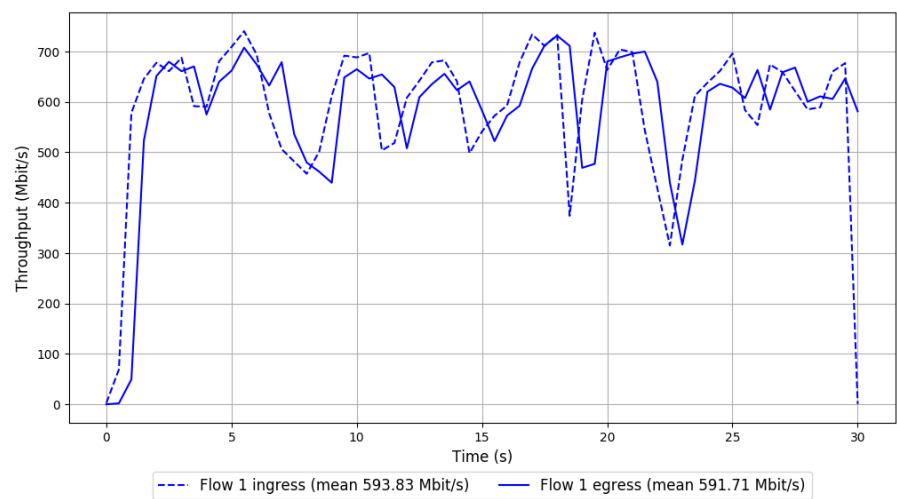


Run 2: Statistics of TCP BBR

Start at: 2018-08-31 13:26:41  
End at: 2018-08-31 13:27:11  
Local clock offset: -0.169 ms  
Remote clock offset: -0.191 ms

# Below is generated by plot.py at 2018-08-31 13:42:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 591.71 Mbit/s  
95th percentile per-packet one-way delay: 131.836 ms  
Loss rate: 0.70%  
-- Flow 1:  
Average throughput: 591.71 Mbit/s  
95th percentile per-packet one-way delay: 131.836 ms  
Loss rate: 0.70%

Run 2: Report of TCP BBR — Data Link

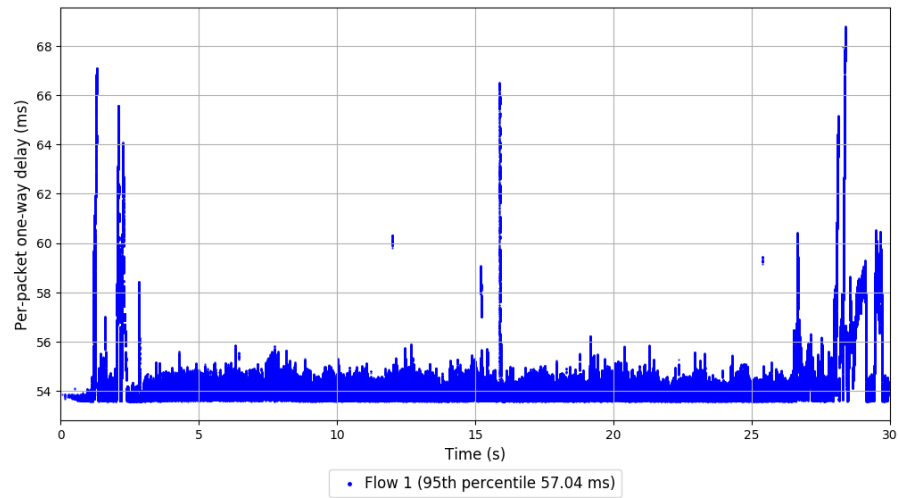
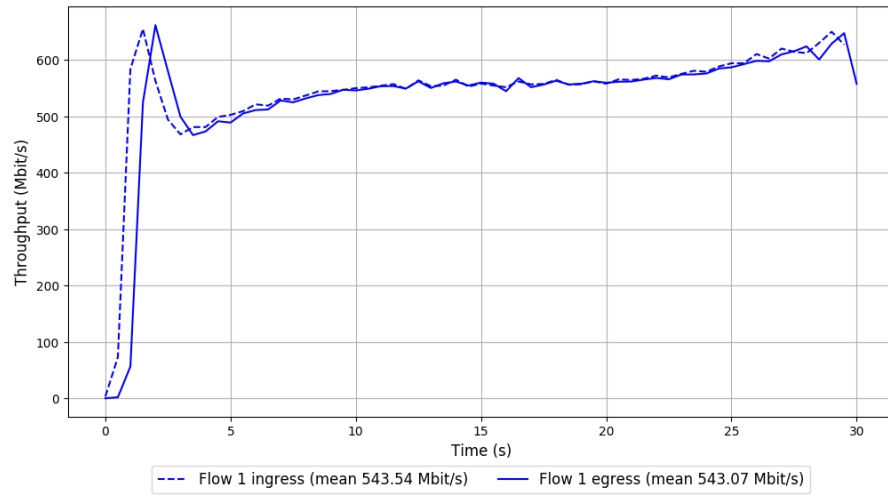


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 13:22:07  
End at: 2018-08-31 13:22:37  
Local clock offset: -0.207 ms  
Remote clock offset: -0.129 ms

# Below is generated by plot.py at 2018-08-31 13:42:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 543.07 Mbit/s  
95th percentile per-packet one-way delay: 57.043 ms  
Loss rate: 0.44%  
-- Flow 1:  
Average throughput: 543.07 Mbit/s  
95th percentile per-packet one-way delay: 57.043 ms  
Loss rate: 0.44%

### Run 1: Report of TCP Cubic — Data Link

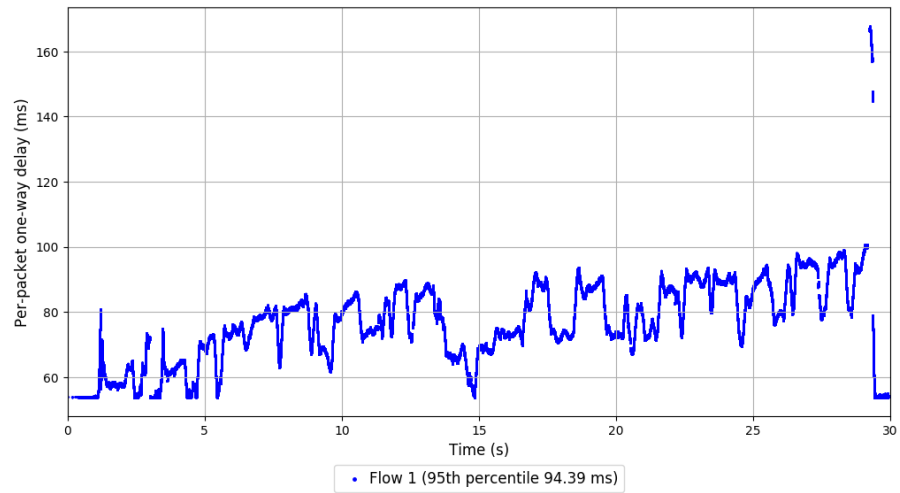
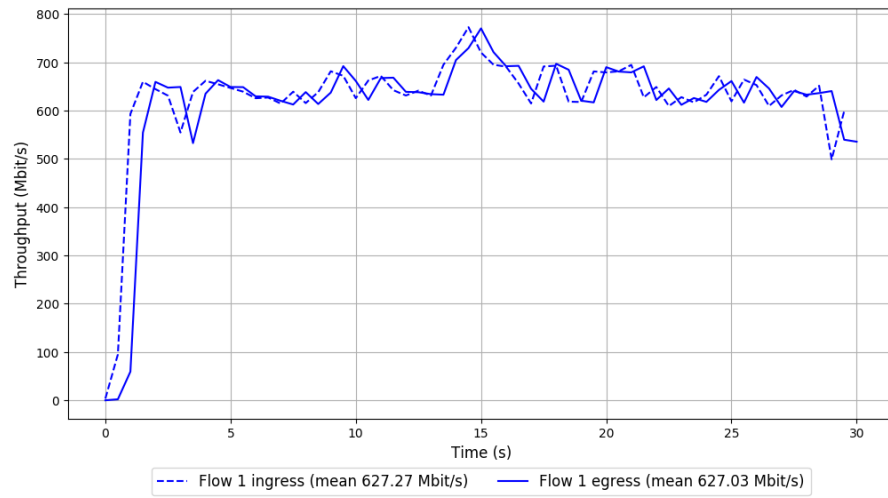


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 13:28:17  
End at: 2018-08-31 13:28:47  
Local clock offset: -0.129 ms  
Remote clock offset: -0.263 ms

# Below is generated by plot.py at 2018-08-31 13:42:18  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 627.03 Mbit/s  
95th percentile per-packet one-way delay: 94.393 ms  
Loss rate: 0.39%  
-- Flow 1:  
Average throughput: 627.03 Mbit/s  
95th percentile per-packet one-way delay: 94.393 ms  
Loss rate: 0.39%

## Run 2: Report of TCP Cubic — Data Link

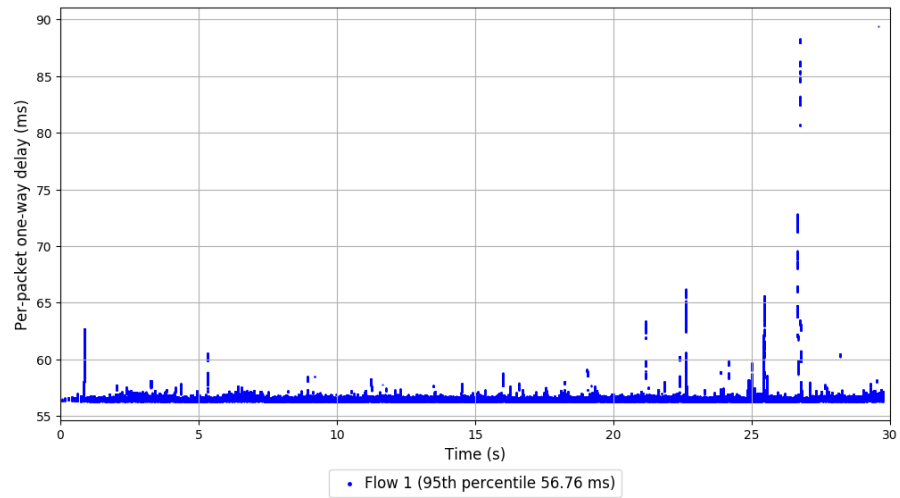
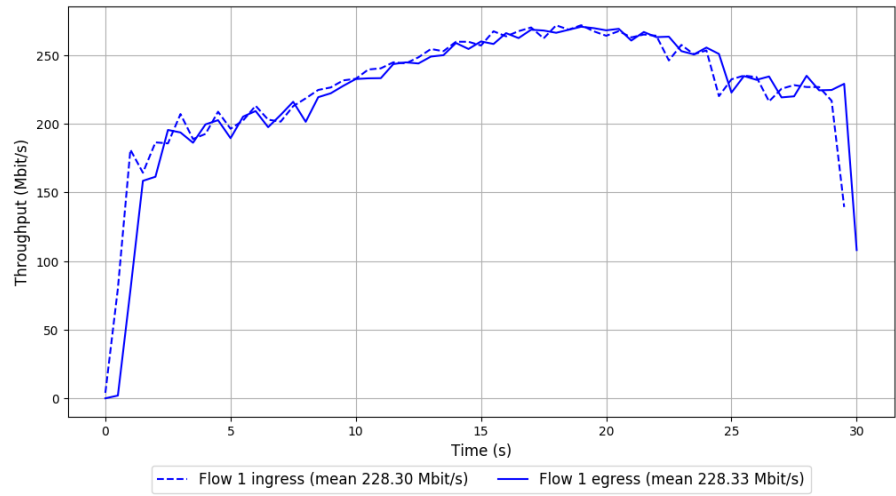


Run 1: Statistics of Indigo

Start at: 2018-08-31 13:23:39  
End at: 2018-08-31 13:24:09  
Local clock offset: -0.121 ms  
Remote clock offset: -2.799 ms

# Below is generated by plot.py at 2018-08-31 13:42:18  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 228.33 Mbit/s  
95th percentile per-packet one-way delay: 56.761 ms  
Loss rate: 0.34%  
-- Flow 1:  
Average throughput: 228.33 Mbit/s  
95th percentile per-packet one-way delay: 56.761 ms  
Loss rate: 0.34%

### Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-31 13:29:52

End at: 2018-08-31 13:30:22

Local clock offset: -0.17 ms

Remote clock offset: -0.237 ms

# Below is generated by plot.py at 2018-08-31 13:42:18

# Datalink statistics

-- Total of 1 flow:

Average throughput: 227.68 Mbit/s

95th percentile per-packet one-way delay: 54.038 ms

Loss rate: 0.35%

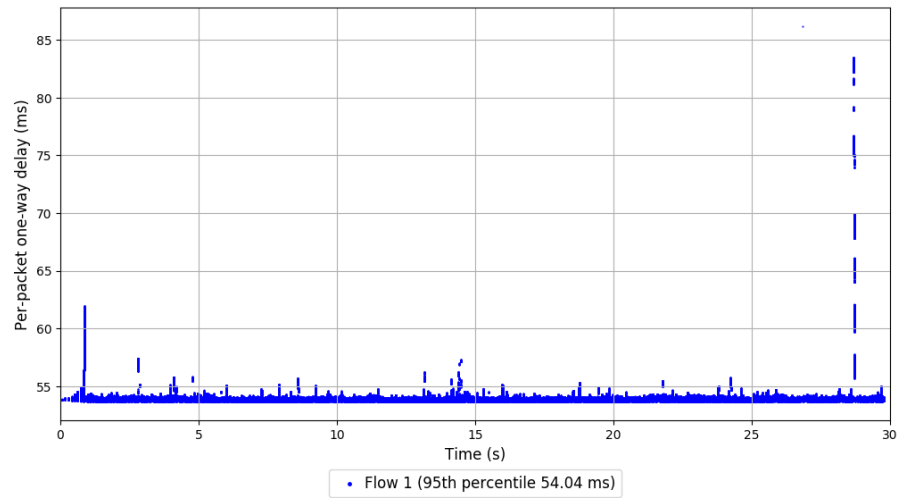
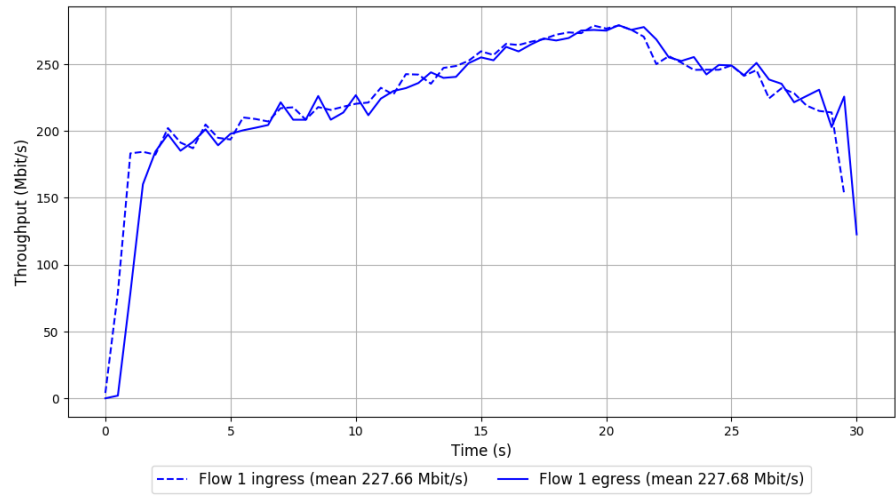
-- Flow 1:

Average throughput: 227.68 Mbit/s

95th percentile per-packet one-way delay: 54.038 ms

Loss rate: 0.35%

## Run 2: Report of Indigo — Data Link

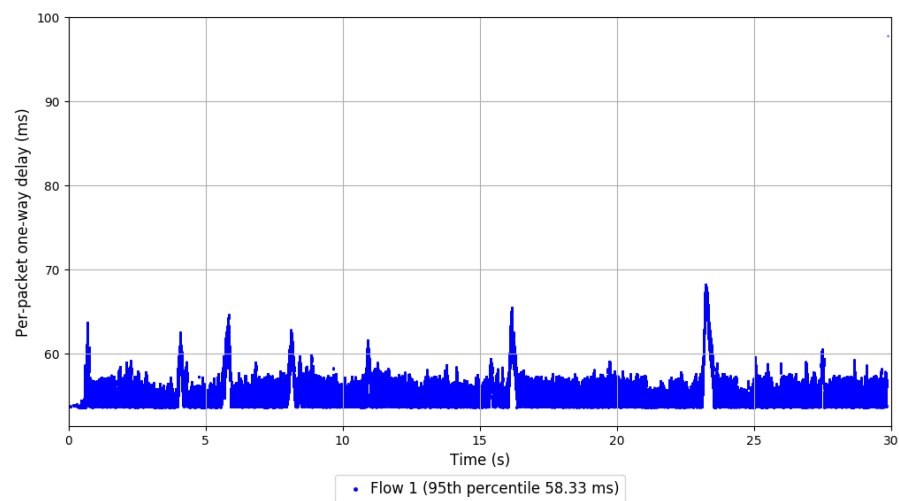
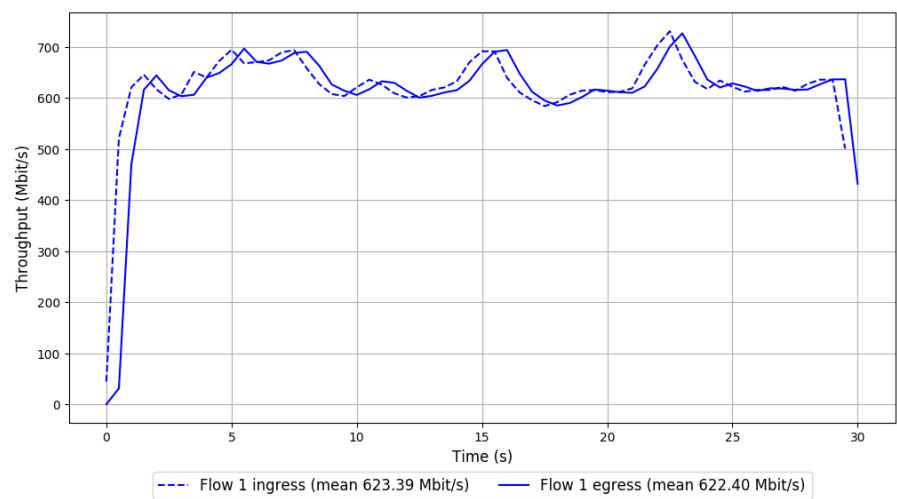


Run 1: Statistics of Muses-25

Start at: 2018-08-31 13:25:04  
End at: 2018-08-31 13:25:34  
Local clock offset: -0.104 ms  
Remote clock offset: -0.061 ms

# Below is generated by plot.py at 2018-08-31 13:43:34  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 622.40 Mbit/s  
95th percentile per-packet one-way delay: 58.330 ms  
Loss rate: 0.37%  
-- Flow 1:  
Average throughput: 622.40 Mbit/s  
95th percentile per-packet one-way delay: 58.330 ms  
Loss rate: 0.37%

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-08-31 13:31:17  
End at: 2018-08-31 13:31:47  
Local clock offset: -0.011 ms  
Remote clock offset: -0.105 ms

# Below is generated by plot.py at 2018-08-31 13:43:37  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 663.99 Mbit/s  
95th percentile per-packet one-way delay: 61.230 ms  
Loss rate: 0.34%  
-- Flow 1:  
Average throughput: 663.99 Mbit/s  
95th percentile per-packet one-way delay: 61.230 ms  
Loss rate: 0.34%

Run 2: Report of Muses-25 — Data Link

