

## Pantheon Report

Generated at 2018-08-28 13:35:10 (UTC).

Data path: GCE Iowa 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.

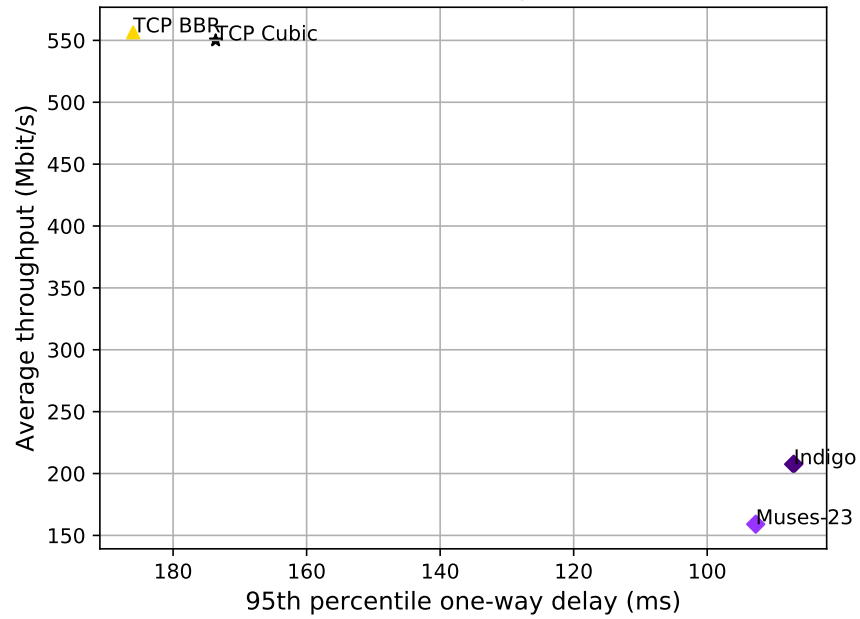
### System info:

```
Linux 4.15.0-1015-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
```

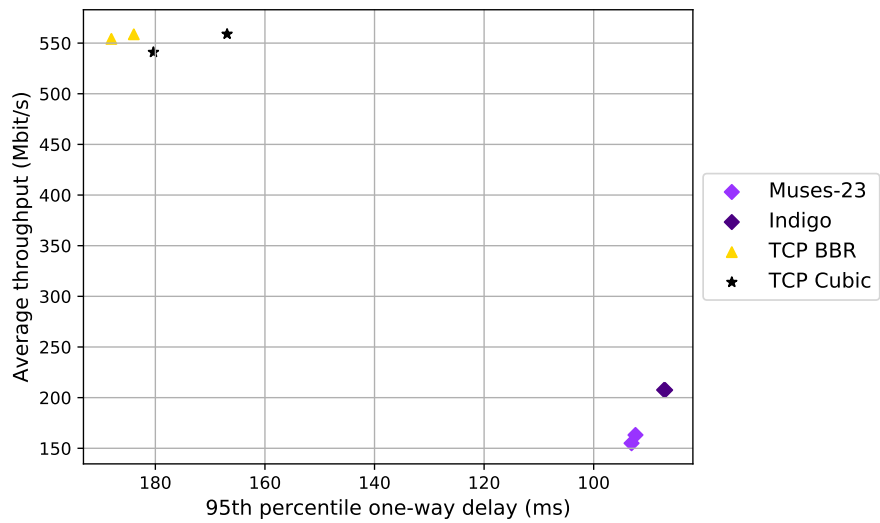
### Git summary:

```
branch: muses-23 @ 88af05c5b0b7531637ca401951507a2fde628df6
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 @ cbf6e6db5ff5740dafa1771f813cd646339e1952
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 Iowa to GCE Sydney, 2 runs of 30s each per scheme  
(mean of all runs by scheme)



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



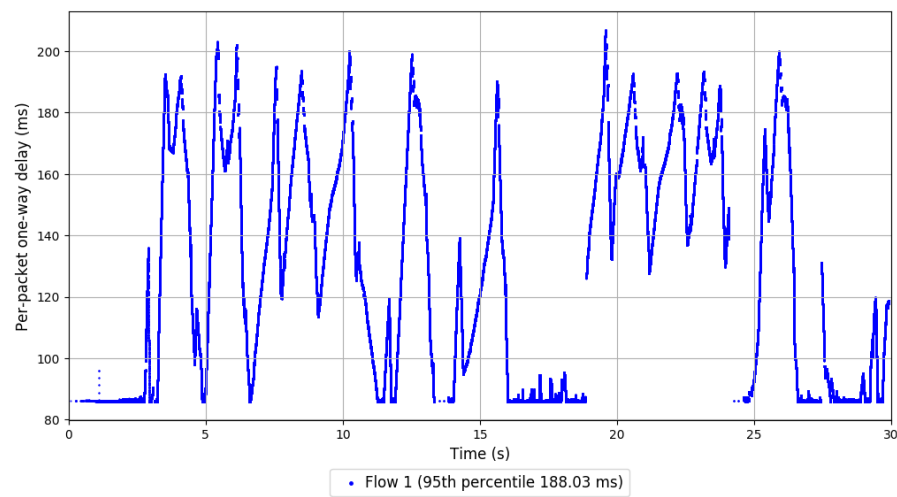
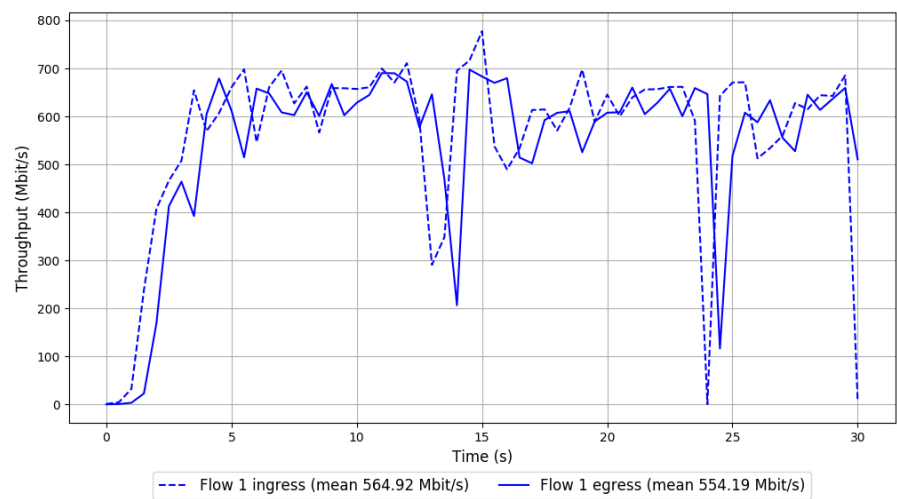
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 2      | 556.44                           | 185.98                              | 2.34                         |
| TCP Cubic | 2      | 549.97                           | 173.63                              | 0.74                         |
| Indigo    | 2      | 207.55                           | 87.05                               | 0.62                         |
| Muses-23  | 2      | 159.06                           | 92.73                               | 0.42                         |

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 13:15:17  
End at: 2018-08-28 13:15:47  
Local clock offset: -0.127 ms  
Remote clock offset: -0.033 ms

# Below is generated by plot.py at 2018-08-28 13:35:07  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 554.19 Mbit/s  
95th percentile per-packet one-way delay: 188.027 ms  
Loss rate: 2.47%  
-- Flow 1:  
Average throughput: 554.19 Mbit/s  
95th percentile per-packet one-way delay: 188.027 ms  
Loss rate: 2.47%

Run 1: Report of TCP BBR — Data Link

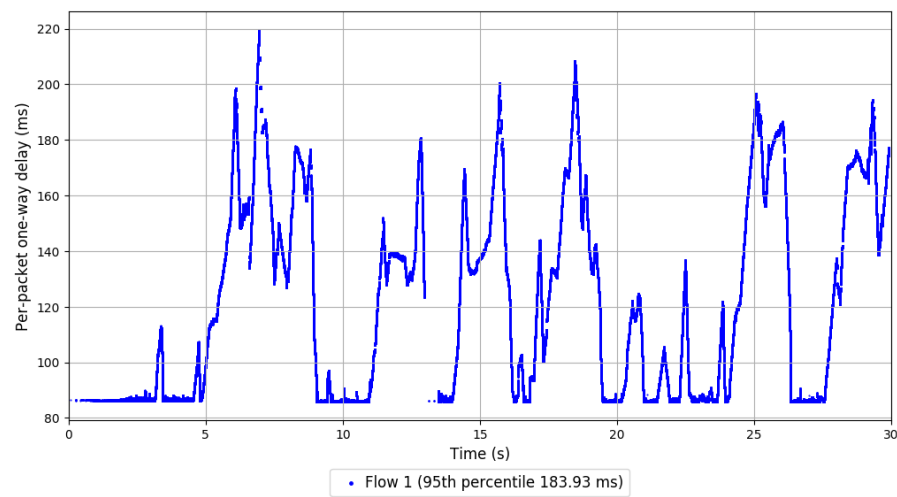
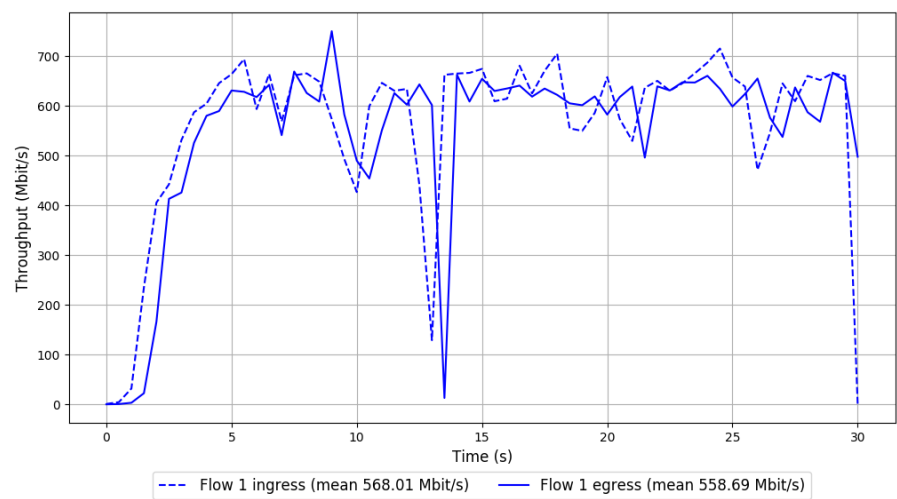


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 13:21:13  
End at: 2018-08-28 13:21:43  
Local clock offset: -0.155 ms  
Remote clock offset: -0.021 ms

# Below is generated by plot.py at 2018-08-28 13:35:09  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 558.69 Mbit/s  
95th percentile per-packet one-way delay: 183.933 ms  
Loss rate: 2.21%  
-- Flow 1:  
Average throughput: 558.69 Mbit/s  
95th percentile per-packet one-way delay: 183.933 ms  
Loss rate: 2.21%

Run 2: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 13:16:55

End at: 2018-08-28 13:17:25

Local clock offset: 0.138 ms

Remote clock offset: -0.0 ms

# Below is generated by plot.py at 2018-08-28 13:35:09

# Datalink statistics

-- Total of 1 flow:

Average throughput: 558.94 Mbit/s

95th percentile per-packet one-way delay: 166.906 ms

Loss rate: 0.71%

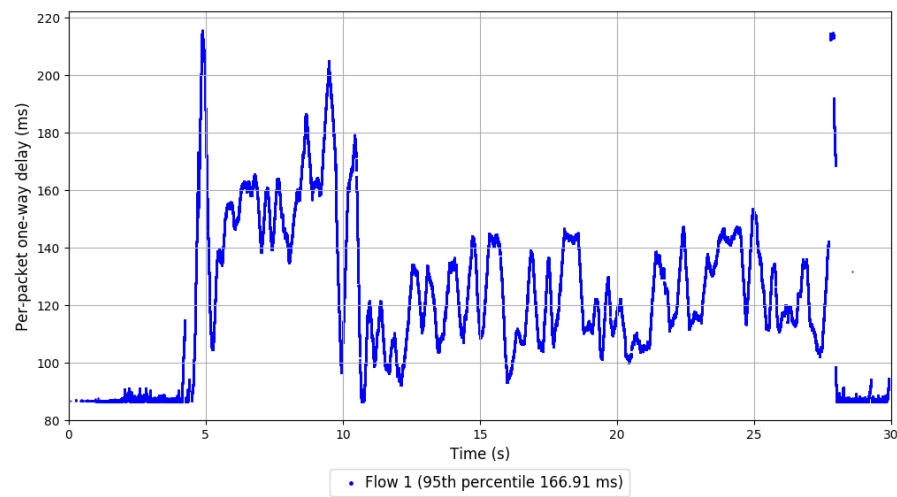
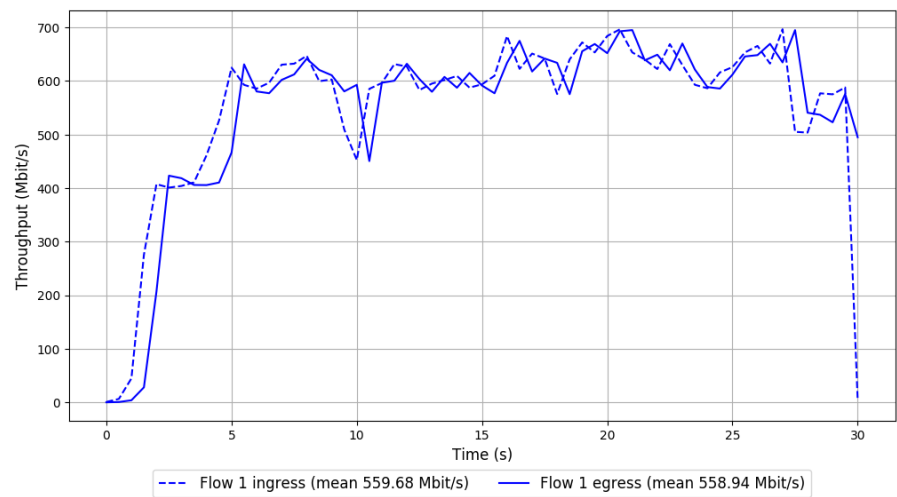
-- Flow 1:

Average throughput: 558.94 Mbit/s

95th percentile per-packet one-way delay: 166.906 ms

Loss rate: 0.71%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 13:22:53

End at: 2018-08-28 13:23:23

Local clock offset: -0.027 ms

Remote clock offset: 0.003 ms

# Below is generated by plot.py at 2018-08-28 13:35:09

# Datalink statistics

-- Total of 1 flow:

Average throughput: 540.99 Mbit/s

95th percentile per-packet one-way delay: 180.348 ms

Loss rate: 0.77%

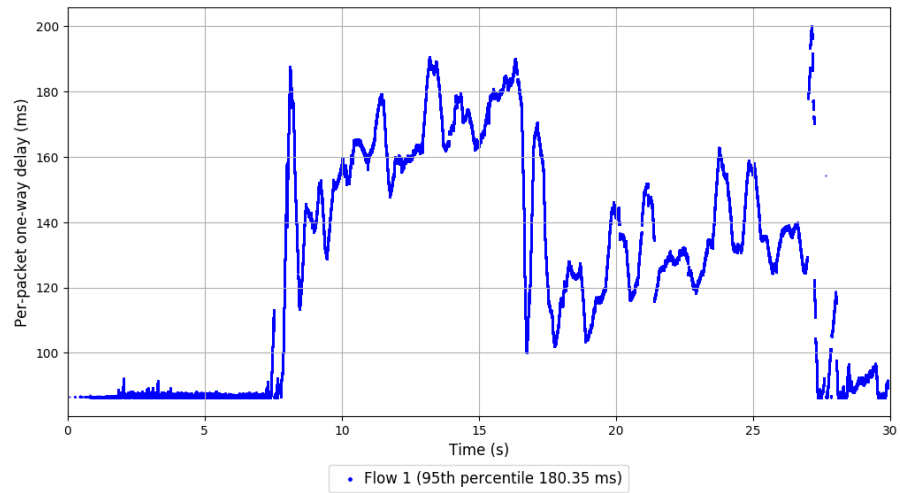
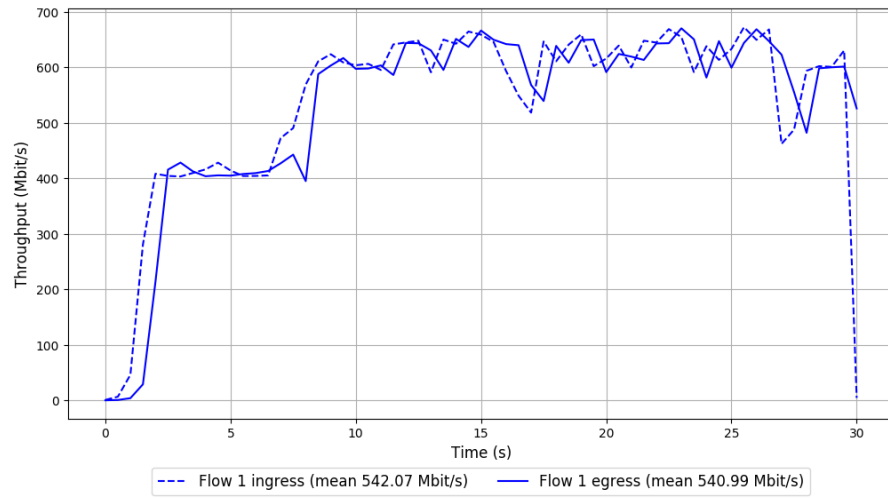
-- Flow 1:

Average throughput: 540.99 Mbit/s

95th percentile per-packet one-way delay: 180.348 ms

Loss rate: 0.77%

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

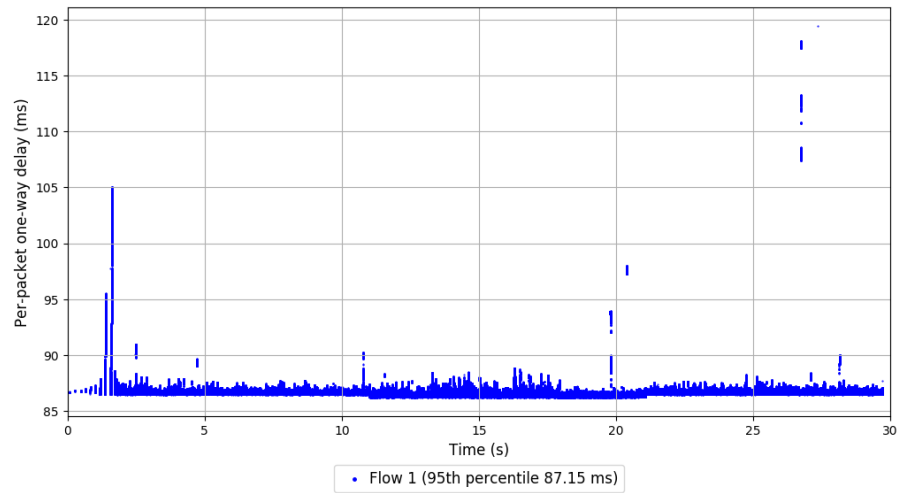
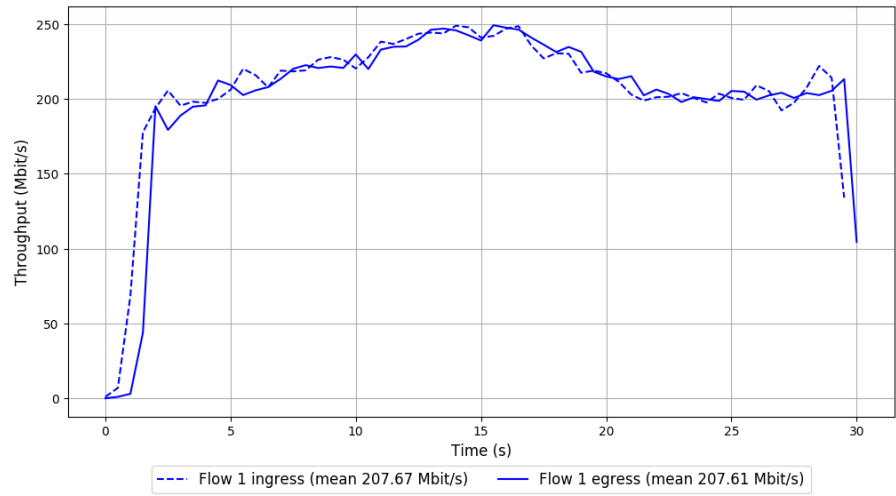


Run 1: Statistics of Indigo

Start at: 2018-08-28 13:18:31  
End at: 2018-08-28 13:19:01  
Local clock offset: 0.195 ms  
Remote clock offset: -0.054 ms

# Below is generated by plot.py at 2018-08-28 13:35:09  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 207.61 Mbit/s  
95th percentile per-packet one-way delay: 87.147 ms  
Loss rate: 0.61%  
-- Flow 1:  
Average throughput: 207.61 Mbit/s  
95th percentile per-packet one-way delay: 87.147 ms  
Loss rate: 0.61%

## Run 1: Report of Indigo — Data Link

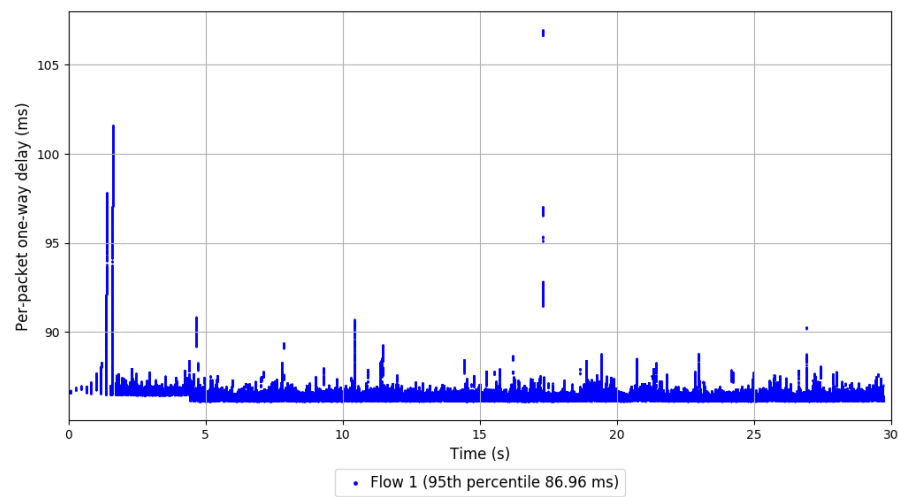
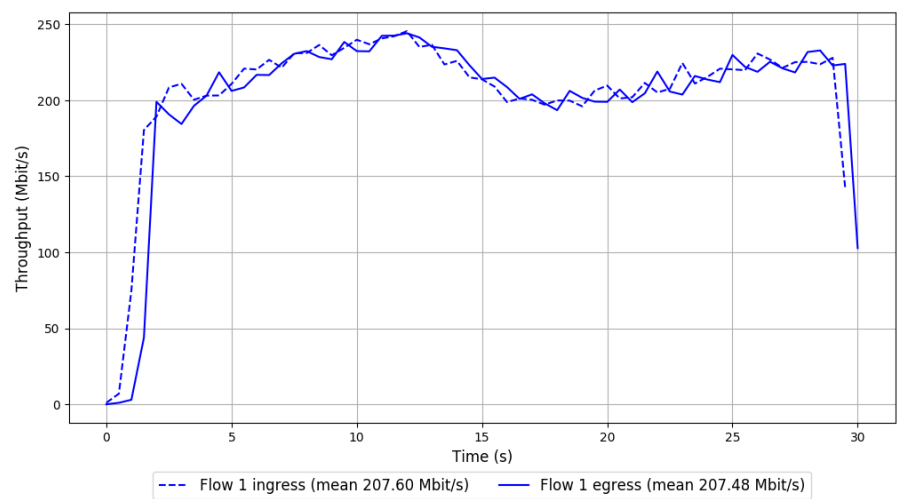


Run 2: Statistics of Indigo

Start at: 2018-08-28 13:24:27  
End at: 2018-08-28 13:24:57  
Local clock offset: 0.037 ms  
Remote clock offset: -0.052 ms

# Below is generated by plot.py at 2018-08-28 13:35:09  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 207.48 Mbit/s  
95th percentile per-packet one-way delay: 86.956 ms  
Loss rate: 0.63%  
-- Flow 1:  
Average throughput: 207.48 Mbit/s  
95th percentile per-packet one-way delay: 86.956 ms  
Loss rate: 0.63%

Run 2: Report of Indigo — Data Link



Run 1: Statistics of Muses-23

Start at: 2018-08-28 13:19:57

End at: 2018-08-28 13:20:27

Local clock offset: -0.212 ms

Remote clock offset: 0.001 ms

# Below is generated by plot.py at 2018-08-28 13:35:09

# Datalink statistics

-- Total of 1 flow:

Average throughput: 163.13 Mbit/s

95th percentile per-packet one-way delay: 92.371 ms

Loss rate: 0.49%

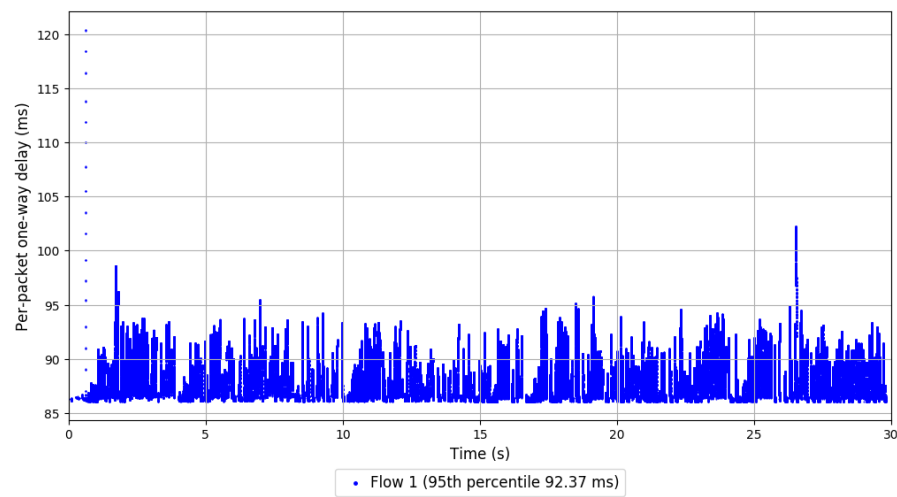
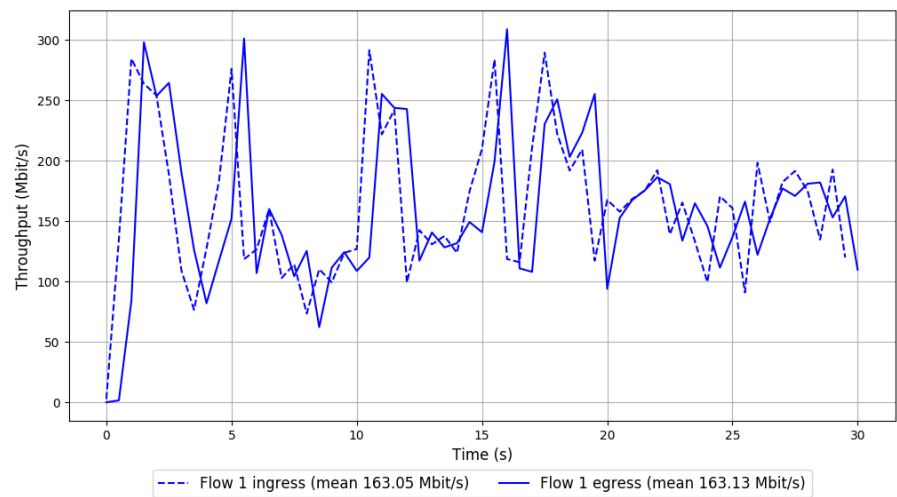
-- Flow 1:

Average throughput: 163.13 Mbit/s

95th percentile per-packet one-way delay: 92.371 ms

Loss rate: 0.49%

Run 1: Report of Muses-23 — Data Link



Run 2: Statistics of Muses-23

Start at: 2018-08-28 13:25:54

End at: 2018-08-28 13:26:24

Local clock offset: 0.089 ms

Remote clock offset: -0.055 ms

# Below is generated by plot.py at 2018-08-28 13:35:09

# Datalink statistics

-- Total of 1 flow:

Average throughput: 155.00 Mbit/s

95th percentile per-packet one-way delay: 93.087 ms

Loss rate: 0.36%

-- Flow 1:

Average throughput: 155.00 Mbit/s

95th percentile per-packet one-way delay: 93.087 ms

Loss rate: 0.36%

Run 2: Report of Muses-23 — Data Link

