

## Pantheon Report

Generated at 2018-08-28 09:50:40 (UTC).

Data path: Mexico on **em1** (*remote*) → AWS California 2 on **ens5** (*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.stanford.edu** and have been applied to correct the timestamps in logs.

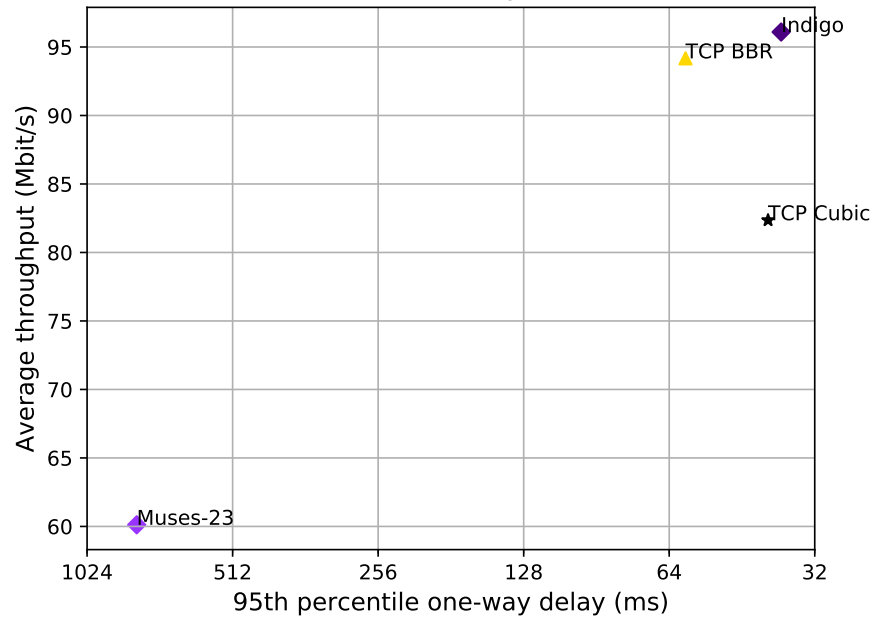
### System info:

```
Linux 4.15.0-1020-aws
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
```

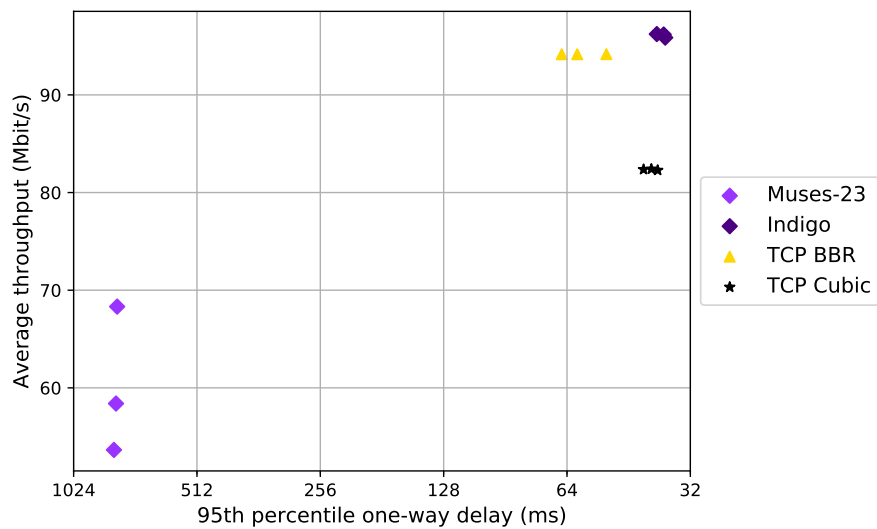
### Git summary:

```
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 @ 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 Mexico to AWS California 2, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from Mexico to AWS California 2, 3 runs of 30s each per scheme



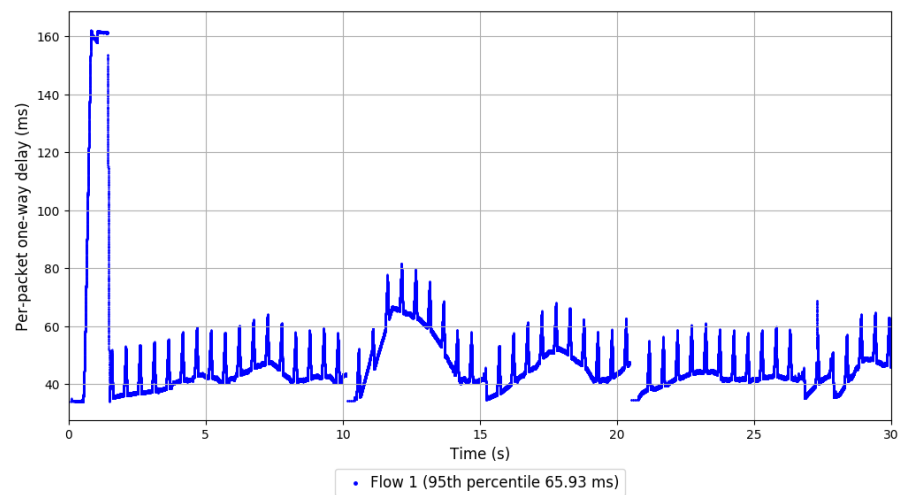
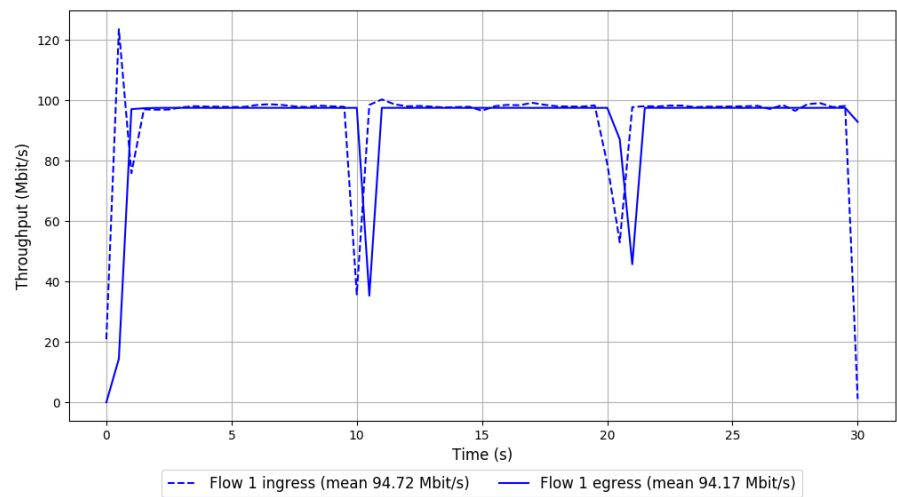
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 3      | 94.17                            | 59.22                               | 0.59                         |
| TCP Cubic | 3      | 82.36                            | 39.97                               | 0.27                         |
| Indigo    | 3      | 96.09                            | 37.55                               | 0.23                         |
| Muses-23  | 3      | 60.12                            | 808.37                              | 1.92                         |

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 09:33:42  
End at: 2018-08-28 09:34:12  
Local clock offset: -27.599 ms  
Remote clock offset: 3.751 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 94.17 Mbit/s  
95th percentile per-packet one-way delay: 65.931 ms  
Loss rate: 0.79%  
-- Flow 1:  
Average throughput: 94.17 Mbit/s  
95th percentile per-packet one-way delay: 65.931 ms  
Loss rate: 0.79%

Run 1: Report of TCP BBR — Data Link

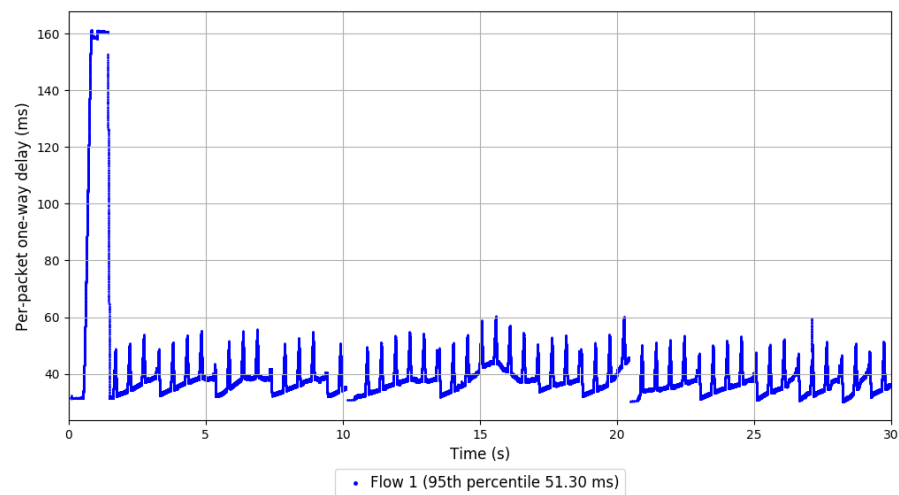
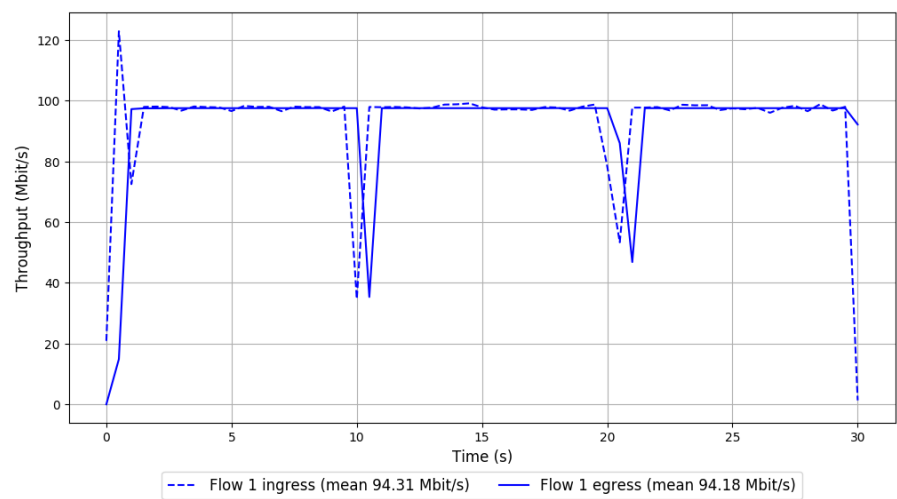


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 09:38:59  
End at: 2018-08-28 09:39:29  
Local clock offset: -32.311 ms  
Remote clock offset: 3.616 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 94.18 Mbit/s  
95th percentile per-packet one-way delay: 51.295 ms  
Loss rate: 0.36%  
-- Flow 1:  
Average throughput: 94.18 Mbit/s  
95th percentile per-packet one-way delay: 51.295 ms  
Loss rate: 0.36%

Run 2: Report of TCP BBR — Data Link



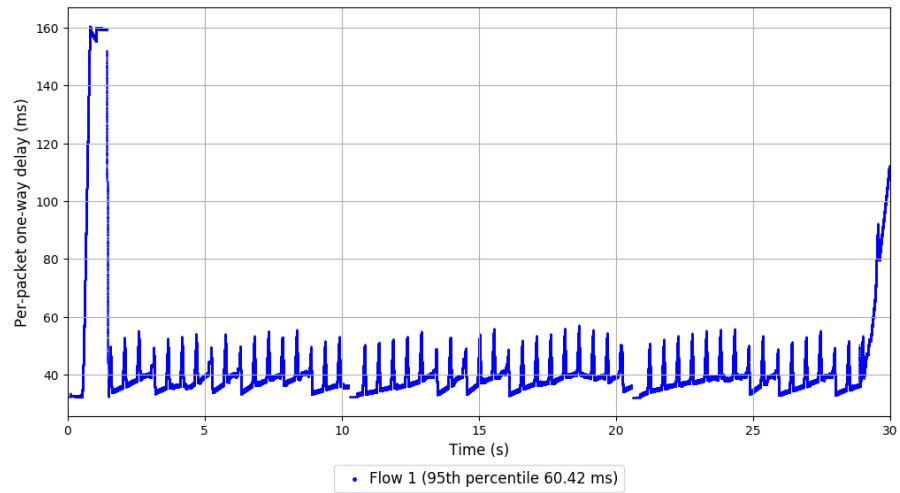
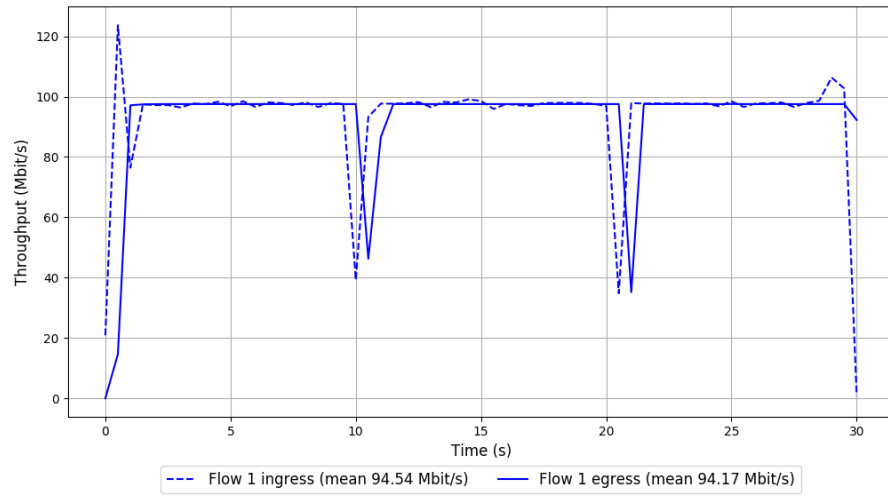
Run 3: Statistics of TCP BBR

Start at: 2018-08-28 09:44:16  
End at: 2018-08-28 09:44:46  
Local clock offset: -19.518 ms  
Remote clock offset: 3.684 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 94.17 Mbit/s  
95th percentile per-packet one-way delay: 60.422 ms  
Loss rate: 0.61%  
-- Flow 1:  
Average throughput: 94.17 Mbit/s  
95th percentile per-packet one-way delay: 60.422 ms  
Loss rate: 0.61%



### Run 3: Report of TCP BBR — Data Link

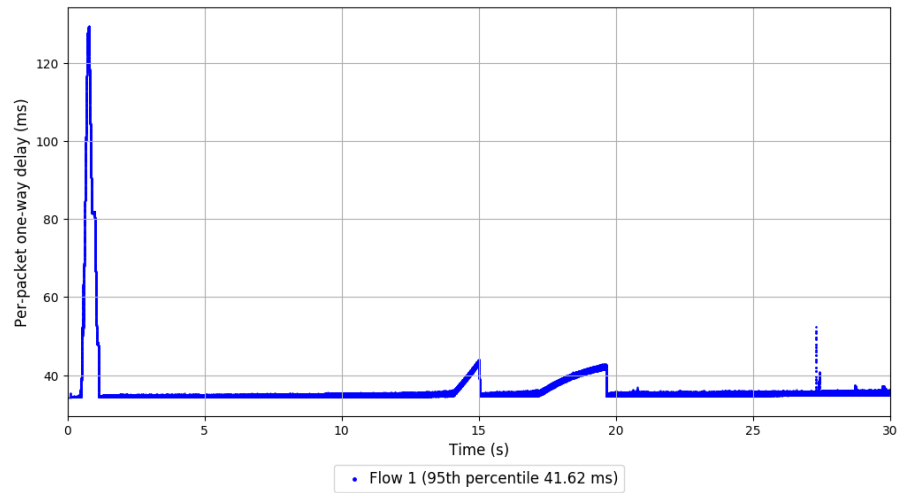
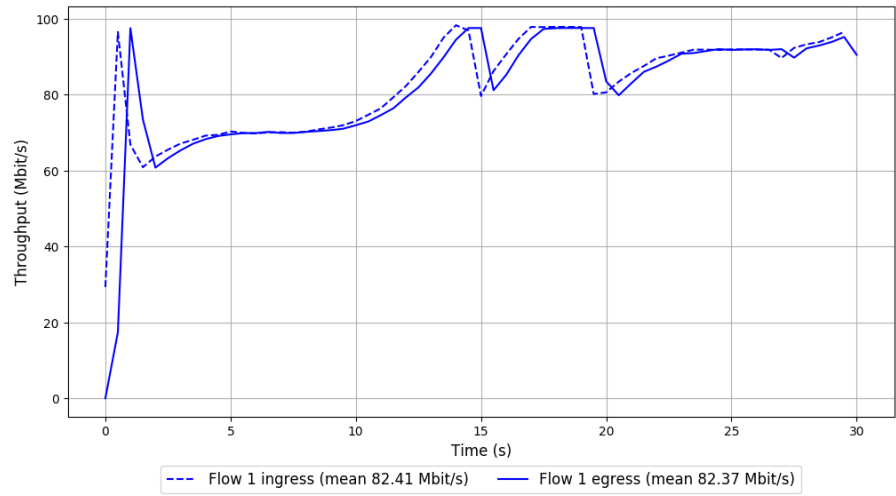


Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 09:35:02  
End at: 2018-08-28 09:35:32  
Local clock offset: -28.943 ms  
Remote clock offset: 3.535 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 82.37 Mbit/s  
95th percentile per-packet one-way delay: 41.623 ms  
Loss rate: 0.26%  
-- Flow 1:  
Average throughput: 82.37 Mbit/s  
95th percentile per-packet one-way delay: 41.623 ms  
Loss rate: 0.26%

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

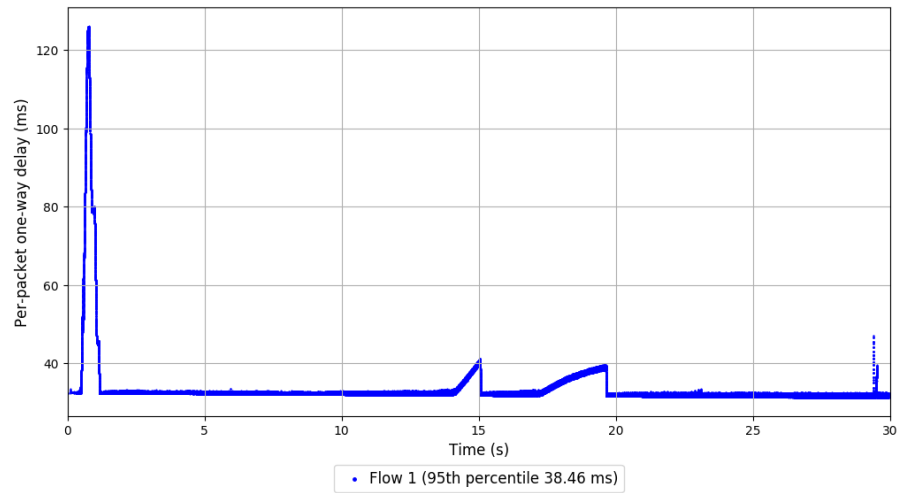
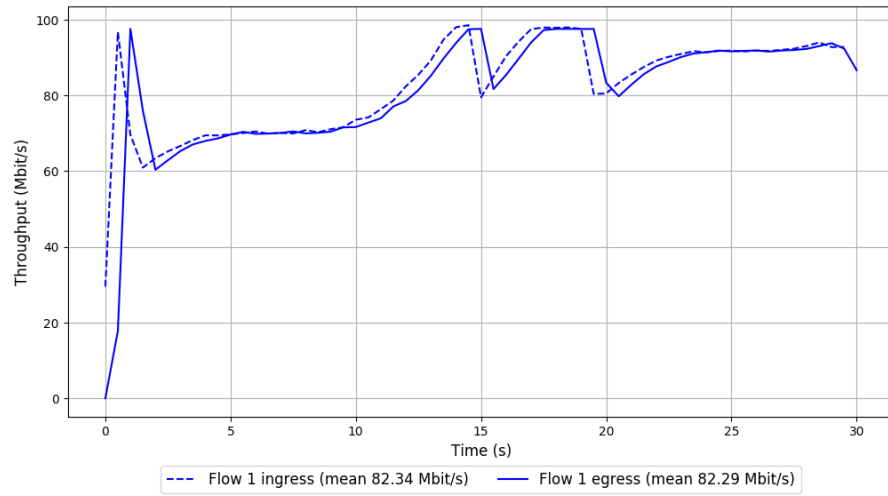


Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 09:40:19  
End at: 2018-08-28 09:40:49  
Local clock offset: -27.614 ms  
Remote clock offset: 3.468 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 82.29 Mbit/s  
95th percentile per-packet one-way delay: 38.456 ms  
Loss rate: 0.28%  
-- Flow 1:  
Average throughput: 82.29 Mbit/s  
95th percentile per-packet one-way delay: 38.456 ms  
Loss rate: 0.28%

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

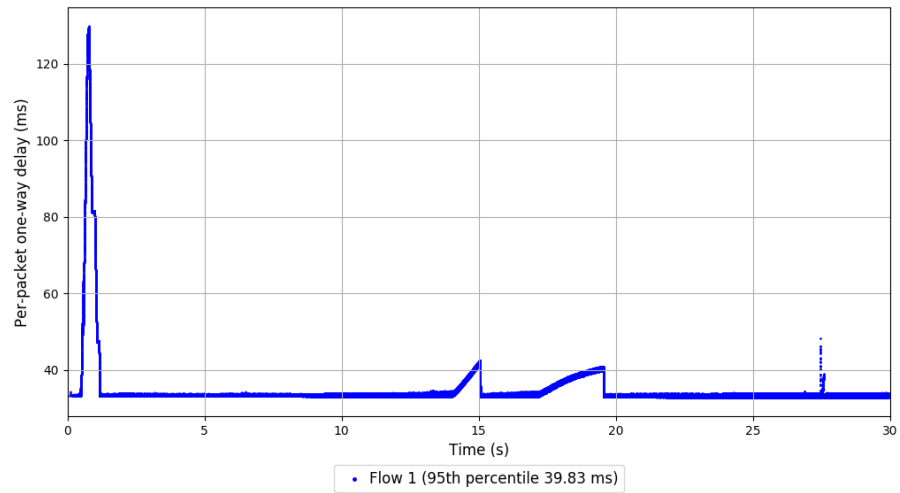
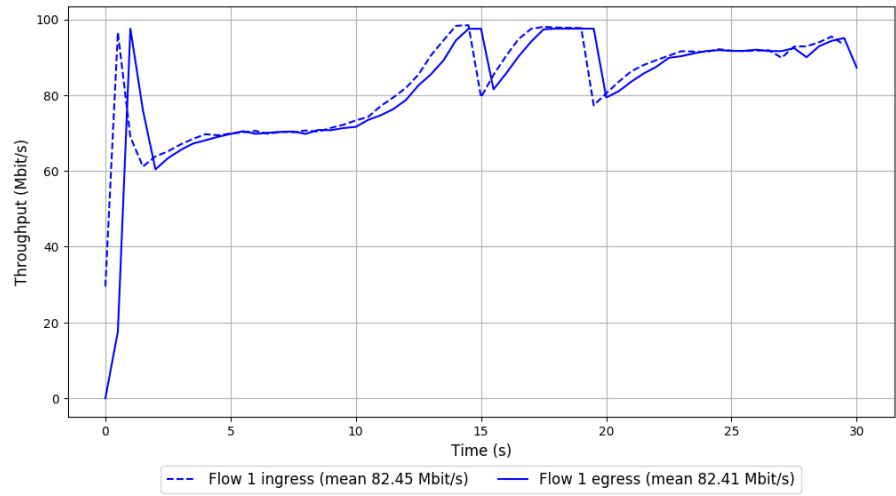


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 09:45:35  
End at: 2018-08-28 09:46:05  
Local clock offset: -17.437 ms  
Remote clock offset: 3.405 ms

# Below is generated by plot.py at 2018-08-28 09:50:10  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 82.41 Mbit/s  
95th percentile per-packet one-way delay: 39.834 ms  
Loss rate: 0.26%  
-- Flow 1:  
Average throughput: 82.41 Mbit/s  
95th percentile per-packet one-way delay: 39.834 ms  
Loss rate: 0.26%

### Run 3: Report of TCP Cubic — Data Link



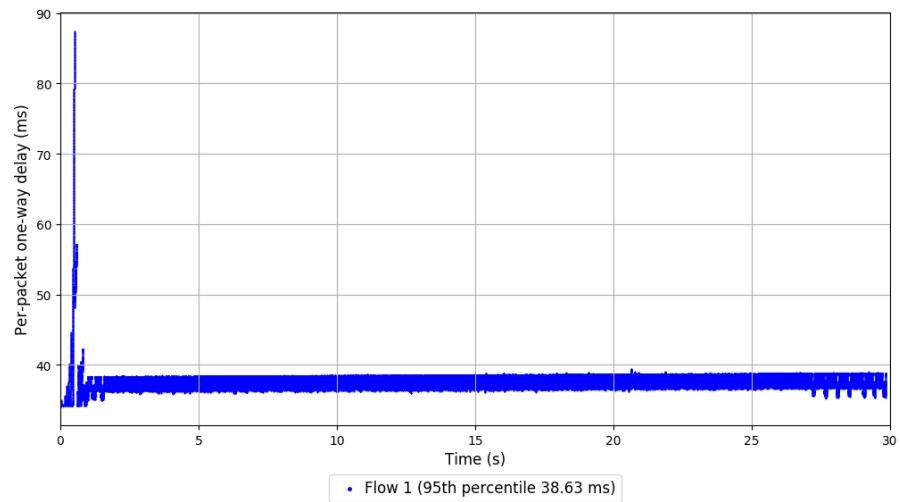
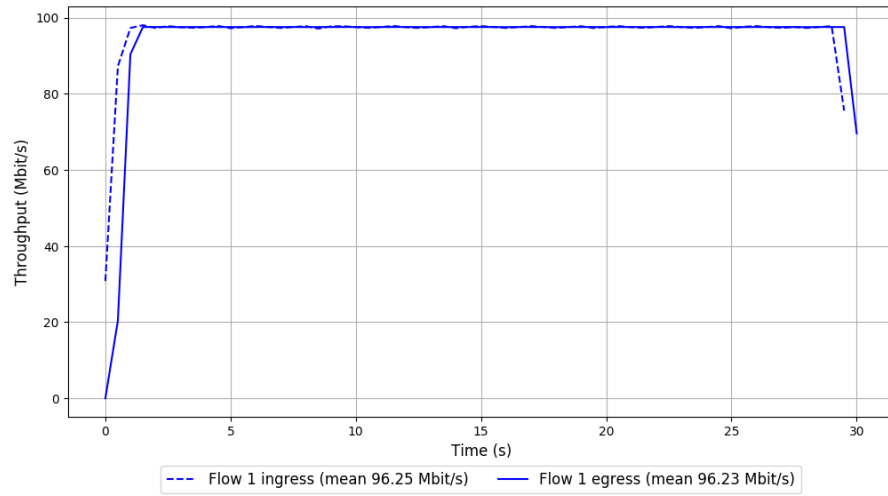
Run 1: Statistics of Indigo

Start at: 2018-08-28 09:37:39  
End at: 2018-08-28 09:38:09  
Local clock offset: -31.881 ms  
Remote clock offset: 3.579 ms

# Below is generated by plot.py at 2018-08-28 09:50:11  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 96.23 Mbit/s  
95th percentile per-packet one-way delay: 38.634 ms  
Loss rate: 0.23%  
-- Flow 1:  
Average throughput: 96.23 Mbit/s  
95th percentile per-packet one-way delay: 38.634 ms  
Loss rate: 0.23%



## Run 1: Report of Indigo — Data Link

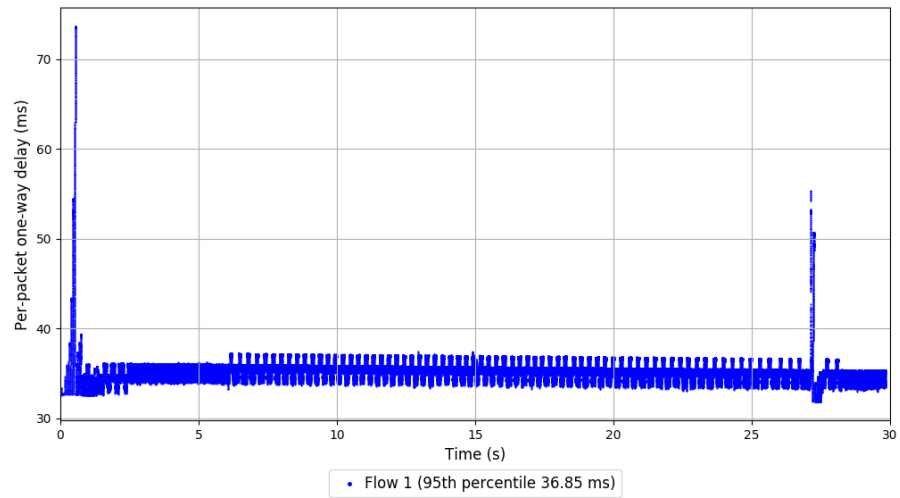
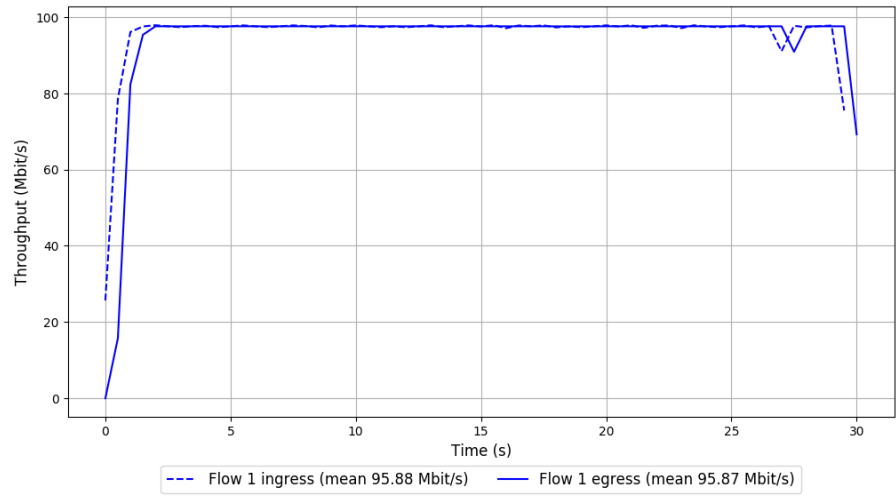


Run 2: Statistics of Indigo

Start at: 2018-08-28 09:42:55  
End at: 2018-08-28 09:43:25  
Local clock offset: -21.528 ms  
Remote clock offset: 3.668 ms

# Below is generated by plot.py at 2018-08-28 09:50:11  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.87 Mbit/s  
95th percentile per-packet one-way delay: 36.851 ms  
Loss rate: 0.23%  
-- Flow 1:  
Average throughput: 95.87 Mbit/s  
95th percentile per-packet one-way delay: 36.851 ms  
Loss rate: 0.23%

## Run 2: Report of Indigo — Data Link

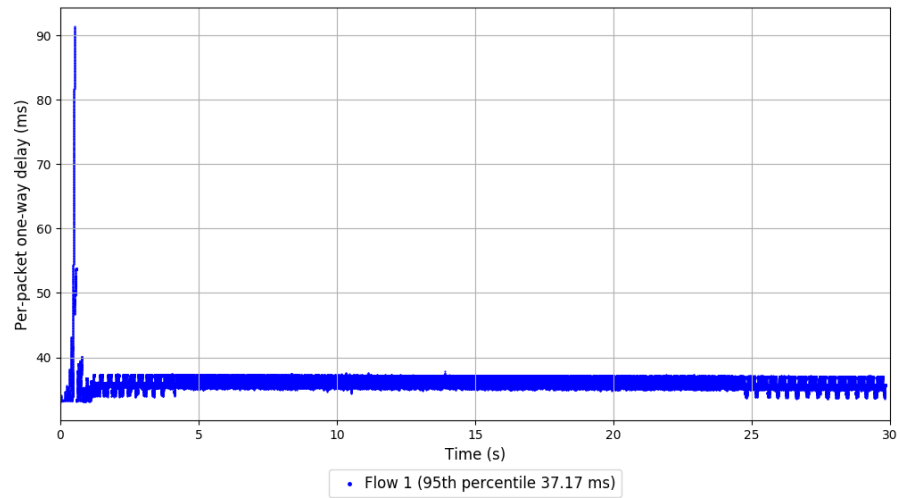
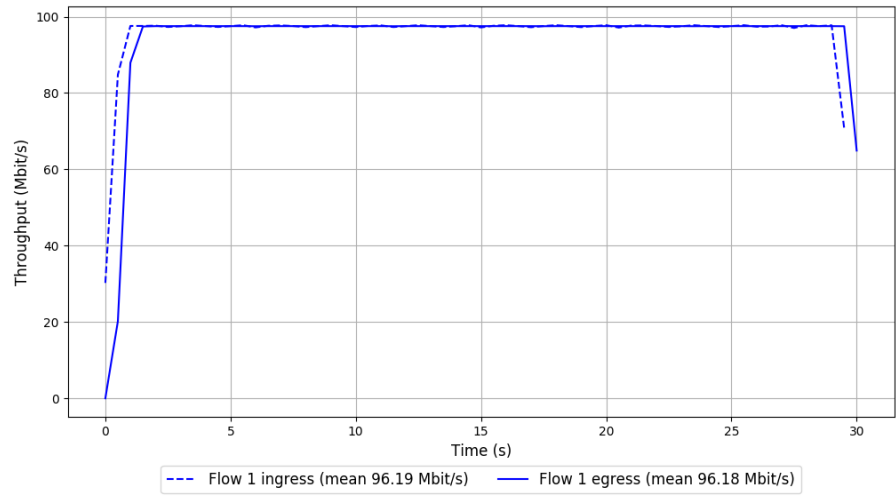


Run 3: Statistics of Indigo

Start at: 2018-08-28 09:48:11  
End at: 2018-08-28 09:48:41  
Local clock offset: -15.014 ms  
Remote clock offset: 3.577 ms

# Below is generated by plot.py at 2018-08-28 09:50:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 96.18 Mbit/s  
95th percentile per-packet one-way delay: 37.174 ms  
Loss rate: 0.23%  
-- Flow 1:  
Average throughput: 96.18 Mbit/s  
95th percentile per-packet one-way delay: 37.174 ms  
Loss rate: 0.23%

### Run 3: Report of Indigo — Data Link

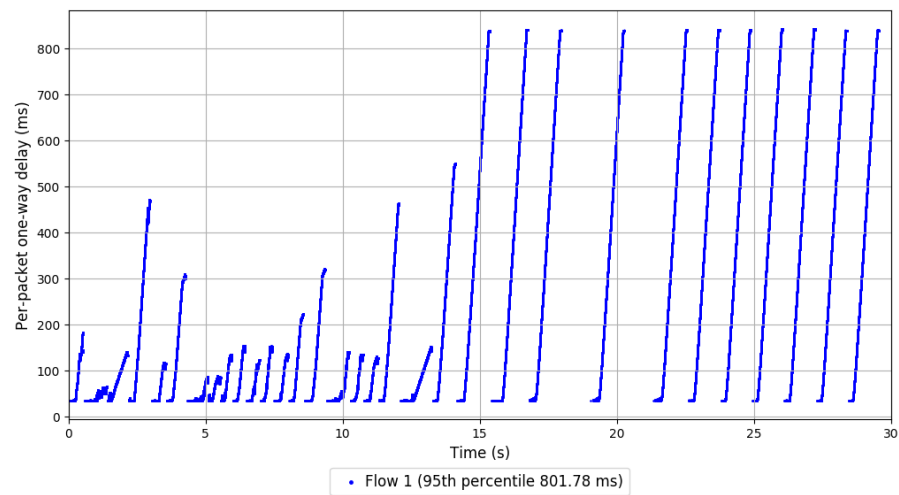
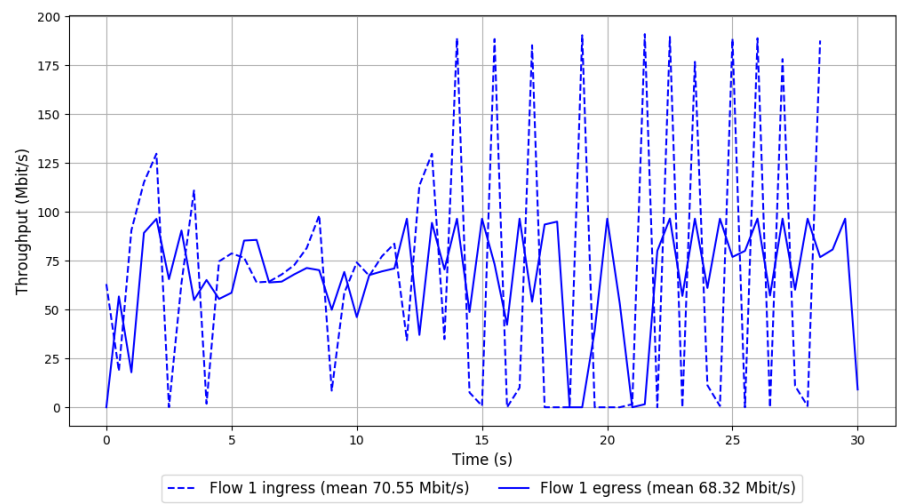


Run 1: Statistics of Muses-23

Start at: 2018-08-28 09:36:20  
End at: 2018-08-28 09:36:50  
Local clock offset: -30.445 ms  
Remote clock offset: 3.672 ms

# Below is generated by plot.py at 2018-08-28 09:50:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 68.32 Mbit/s  
95th percentile per-packet one-way delay: 801.779 ms  
Loss rate: 0.44%  
-- Flow 1:  
Average throughput: 68.32 Mbit/s  
95th percentile per-packet one-way delay: 801.779 ms  
Loss rate: 0.44%

Run 1: Report of Muses-23 — Data Link



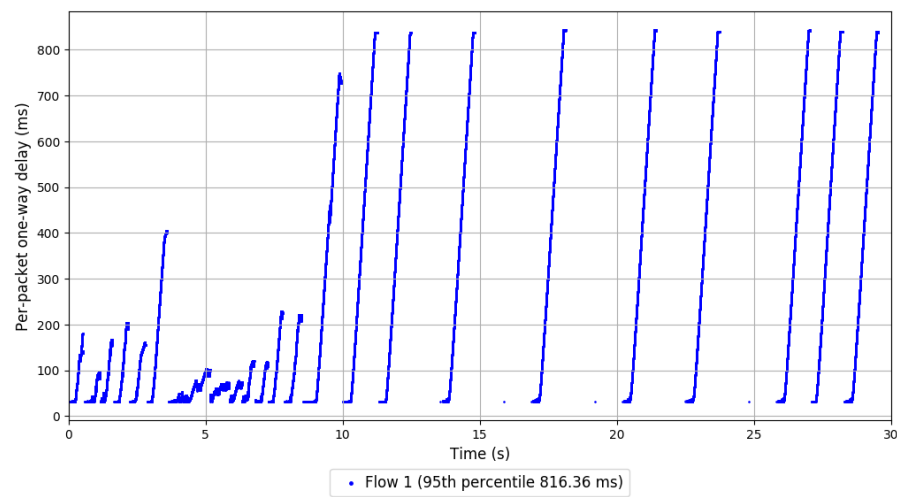
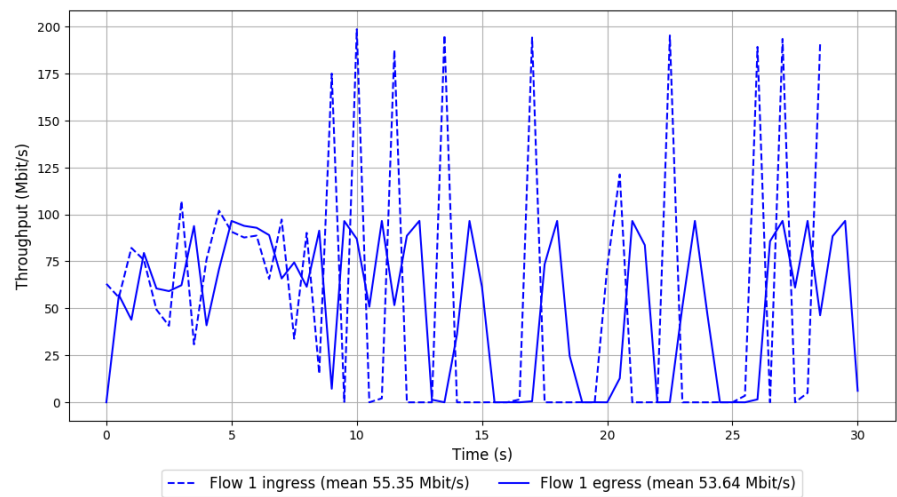
Run 2: Statistics of Muses-23

Start at: 2018-08-28 09:41:38  
End at: 2018-08-28 09:42:08  
Local clock offset: -24.434 ms  
Remote clock offset: 3.677 ms

# Below is generated by plot.py at 2018-08-28 09:50:39  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 53.64 Mbit/s  
95th percentile per-packet one-way delay: 816.358 ms  
Loss rate: 0.36%  
-- Flow 1:  
Average throughput: 53.64 Mbit/s  
95th percentile per-packet one-way delay: 816.358 ms  
Loss rate: 0.36%



Run 2: Report of Muses-23 — Data Link



Run 3: Statistics of Muses-23

Start at: 2018-08-28 09:46:53

End at: 2018-08-28 09:47:23

Local clock offset: -16.21 ms

Remote clock offset: 3.551 ms

# Below is generated by plot.py at 2018-08-28 09:50:39

# Datalink statistics

-- Total of 1 flow:

Average throughput: 58.39 Mbit/s

95th percentile per-packet one-way delay: 806.966 ms

Loss rate: 4.96%

-- Flow 1:

Average throughput: 58.39 Mbit/s

95th percentile per-packet one-way delay: 806.966 ms

Loss rate: 4.96%

Run 3: Report of Muses-23 — Data Link

