

## Pantheon Report

Generated at 2018-08-28 08:58:03 (UTC).

Data path: AWS California 2 on **ens5** (*local*) → Mexico on **em1** (*remote*).

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.

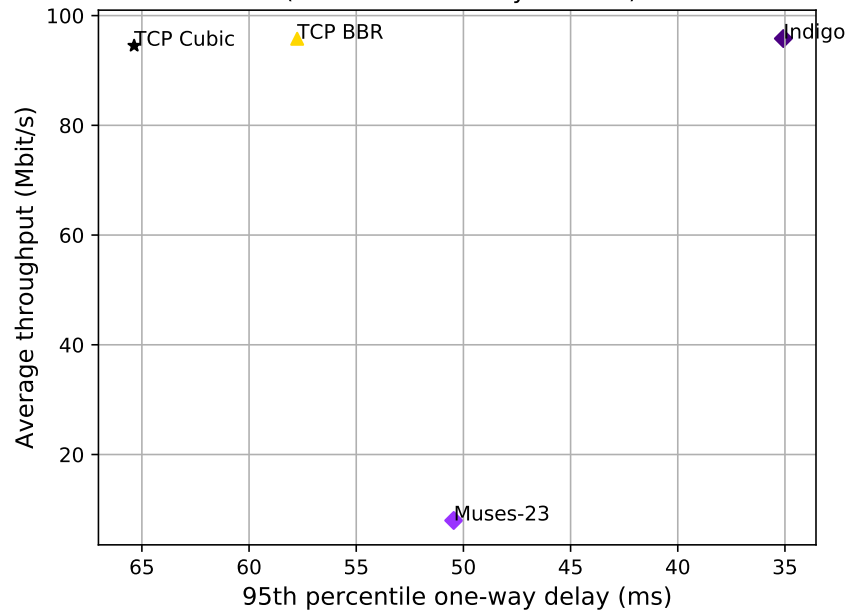
### System info:

```
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
```

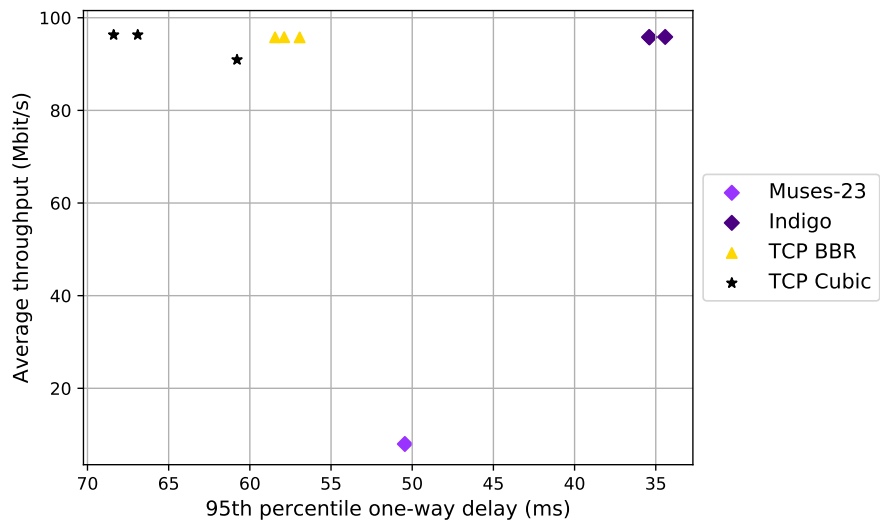
### Git summary:

```
branch: muses-23 @ 88af05c5b0b7531637ca401951507a2fde628df6
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf5e562f4
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 AWS California 2 to Mexico, 3 runs of 30s each per scheme  
(mean of all runs by scheme)



test from AWS California 2 to Mexico, 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      | 95.78                            | 57.75                               | 0.99                         |
| TCP Cubic | 3      | 94.51                            | 65.36                               | 0.46                         |
| Indigo    | 3      | 95.82                            | 35.07                               | 0.01                         |
| Muses-23  | 1      | 7.98                             | 50.45                               | 46.07                        |

Run 1: Statistics of TCP BBR

Start at: 2018-08-28 08:44:22

End at: 2018-08-28 08:44:52

Local clock offset: -4.087 ms

Remote clock offset: 4.056 ms

# Below is generated by plot.py at 2018-08-28 08:57:54

# Datalink statistics

-- Total of 1 flow:

Average throughput: 95.76 Mbit/s

95th percentile per-packet one-way delay: 56.932 ms

Loss rate: 1.07%

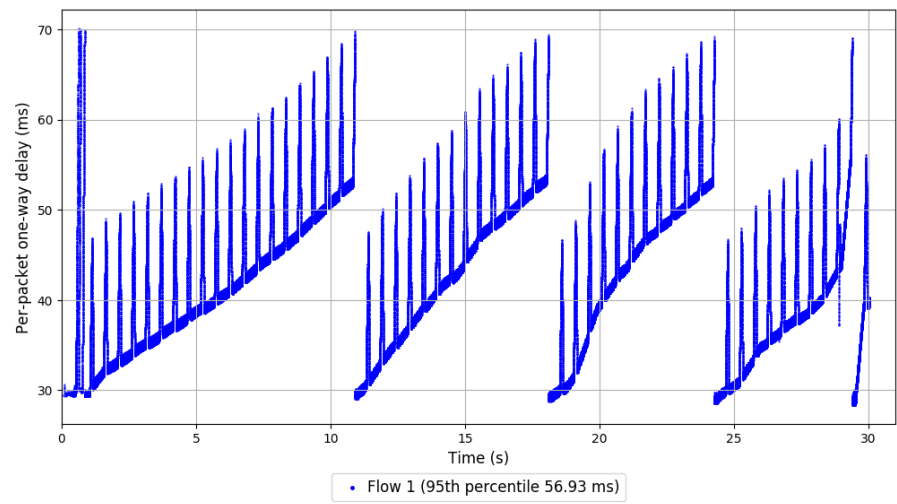
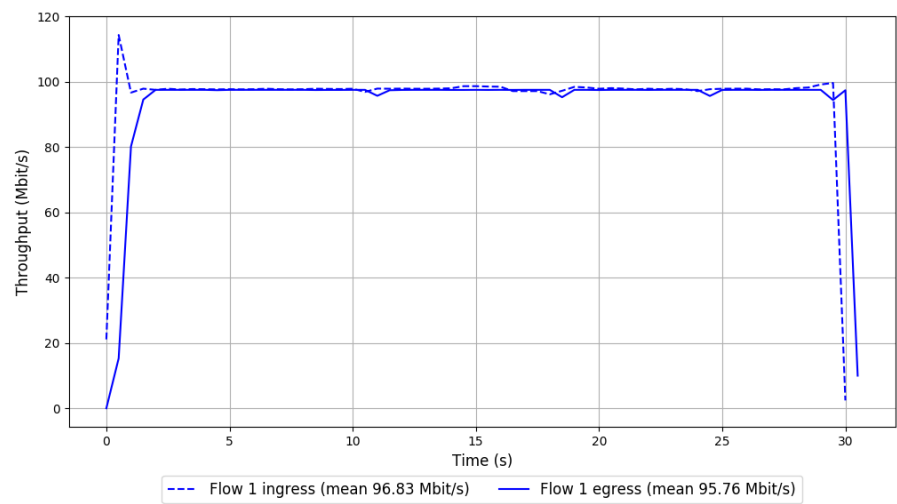
-- Flow 1:

Average throughput: 95.76 Mbit/s

95th percentile per-packet one-way delay: 56.932 ms

Loss rate: 1.07%

Run 1: Report of TCP BBR — Data Link

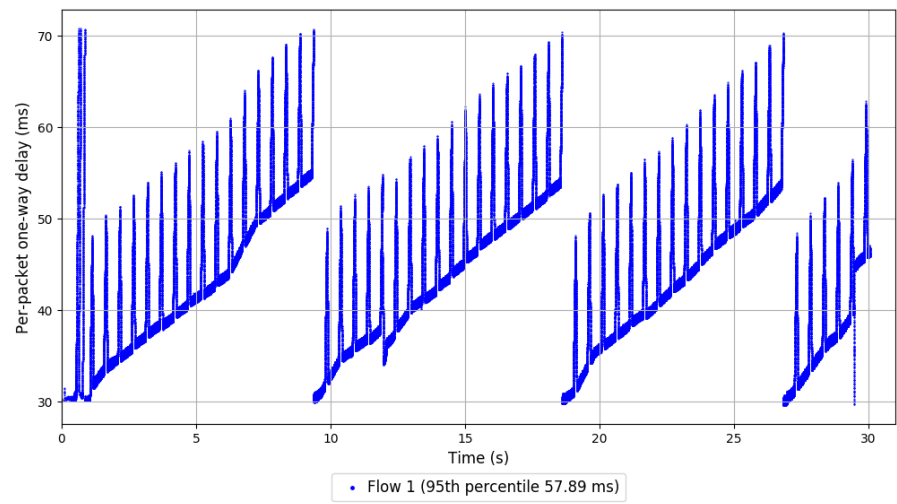
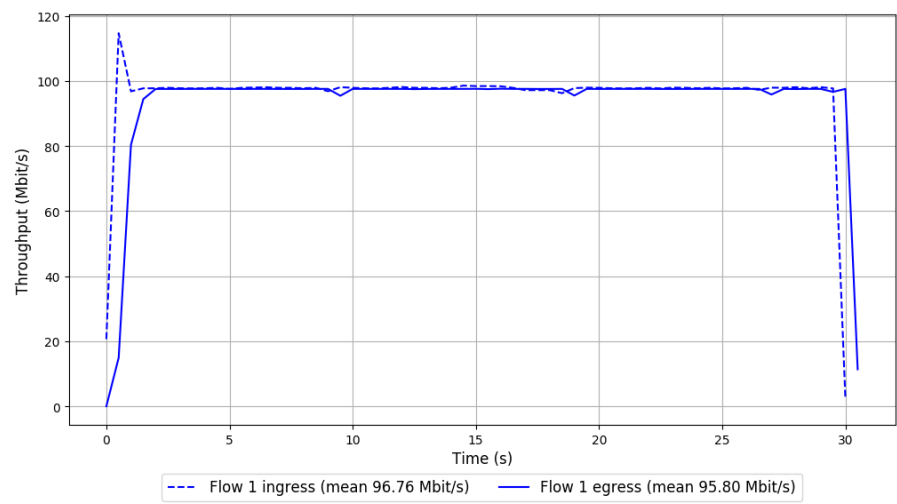


Run 2: Statistics of TCP BBR

Start at: 2018-08-28 08:49:34  
End at: 2018-08-28 08:50:04  
Local clock offset: -10.185 ms  
Remote clock offset: 4.143 ms

# Below is generated by plot.py at 2018-08-28 08:57:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.80 Mbit/s  
95th percentile per-packet one-way delay: 57.887 ms  
Loss rate: 0.94%  
-- Flow 1:  
Average throughput: 95.80 Mbit/s  
95th percentile per-packet one-way delay: 57.887 ms  
Loss rate: 0.94%

Run 2: Report of TCP BBR — Data Link



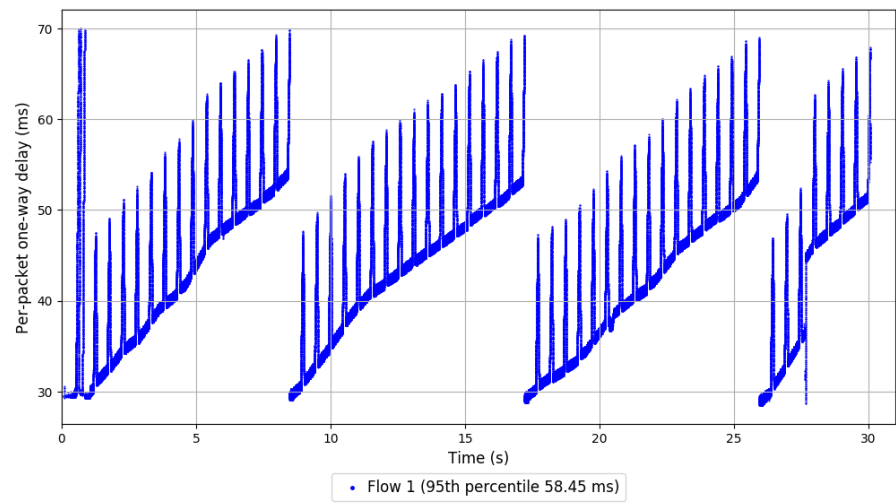
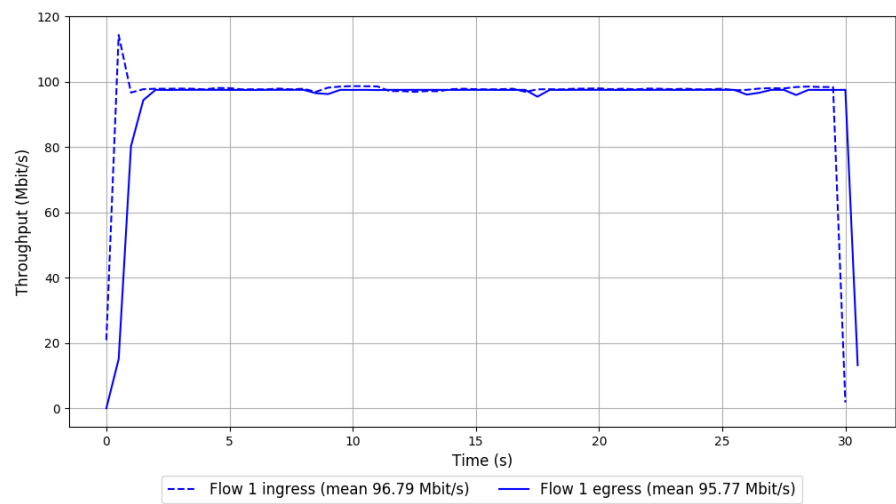
Run 3: Statistics of TCP BBR

Start at: 2018-08-28 08:54:46  
End at: 2018-08-28 08:55:16  
Local clock offset: -18.238 ms  
Remote clock offset: 4.094 ms

# Below is generated by plot.py at 2018-08-28 08:57:57  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.77 Mbit/s  
95th percentile per-packet one-way delay: 58.446 ms  
Loss rate: 0.96%  
-- Flow 1:  
Average throughput: 95.77 Mbit/s  
95th percentile per-packet one-way delay: 58.446 ms  
Loss rate: 0.96%



Run 3: Report of TCP BBR — Data Link



Run 1: Statistics of TCP Cubic

Start at: 2018-08-28 08:41:43

End at: 2018-08-28 08:42:13

Local clock offset: -0.39 ms

Remote clock offset: 4.184 ms

# Below is generated by plot.py at 2018-08-28 08:57:58

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.30 Mbit/s

95th percentile per-packet one-way delay: 66.905 ms

Loss rate: 0.44%

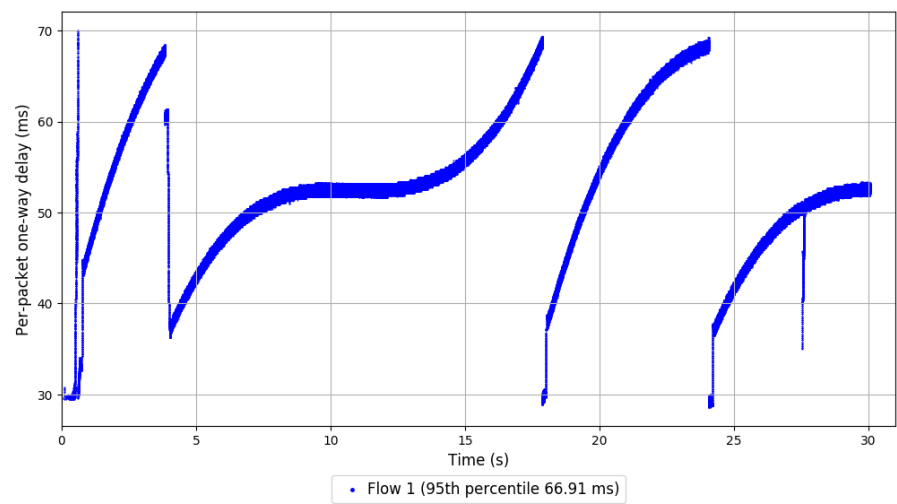
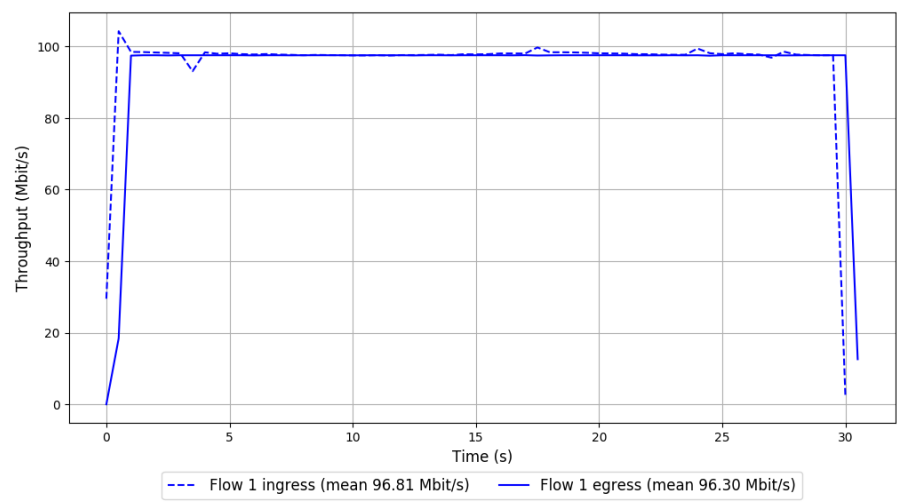
-- Flow 1:

Average throughput: 96.30 Mbit/s

95th percentile per-packet one-way delay: 66.905 ms

Loss rate: 0.44%

Run 1: Report of TCP Cubic — Data Link



Run 2: Statistics of TCP Cubic

Start at: 2018-08-28 08:46:55

End at: 2018-08-28 08:47:25

Local clock offset: -9.709 ms

Remote clock offset: 4.231 ms

# Below is generated by plot.py at 2018-08-28 08:57:58

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.30 Mbit/s

95th percentile per-packet one-way delay: 68.389 ms

Loss rate: 0.45%

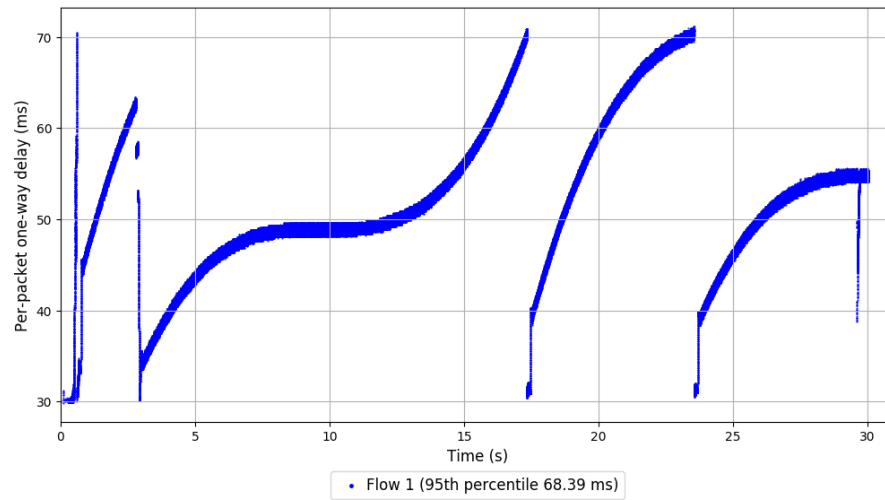
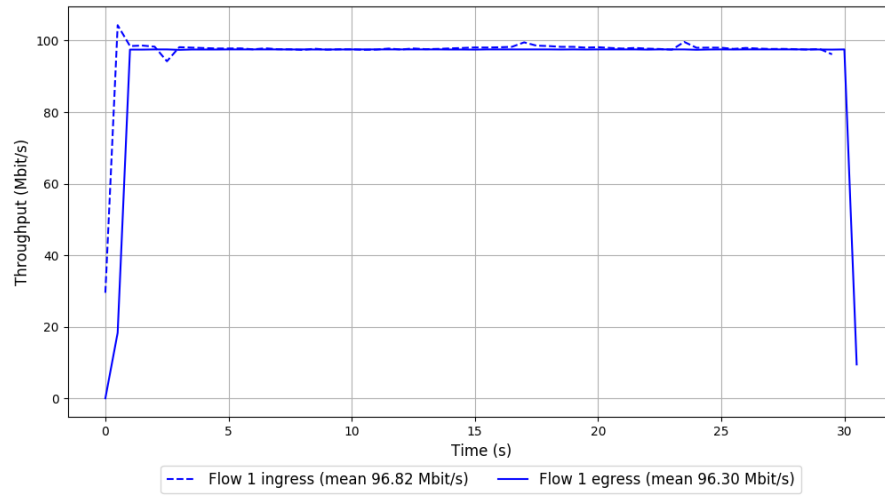
-- Flow 1:

Average throughput: 96.30 Mbit/s

95th percentile per-packet one-way delay: 68.389 ms

Loss rate: 0.45%

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

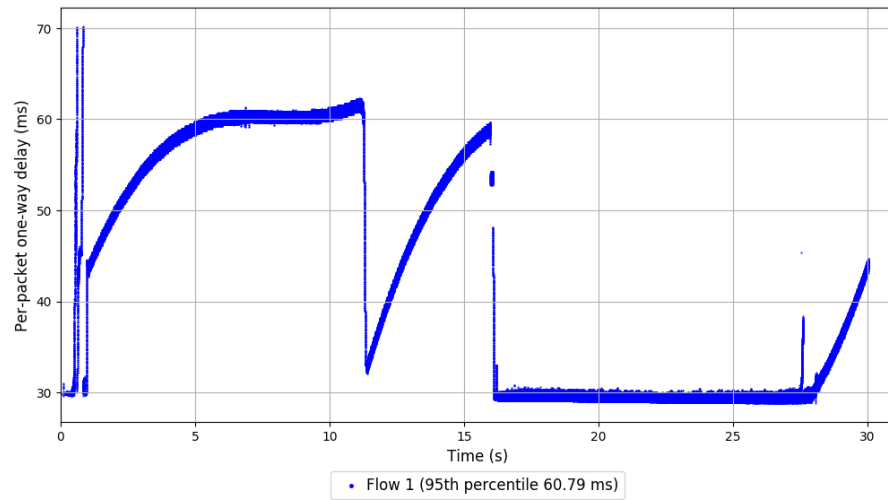
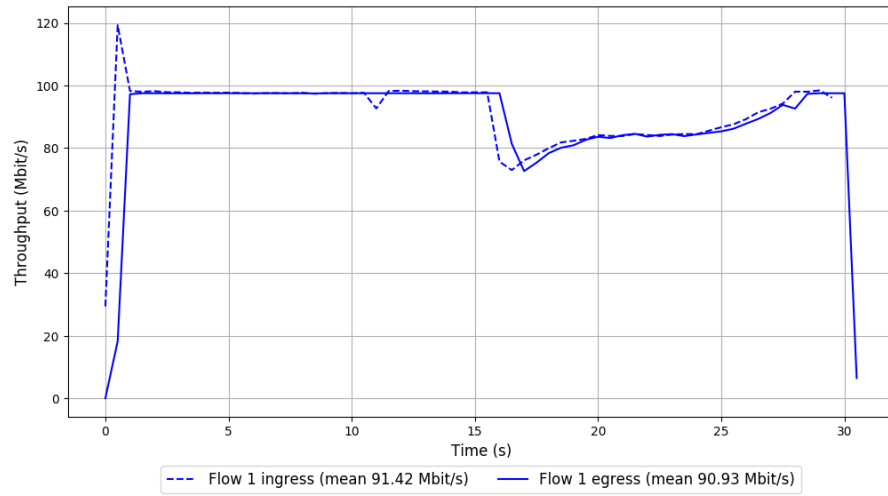


Run 3: Statistics of TCP Cubic

Start at: 2018-08-28 08:52:08  
End at: 2018-08-28 08:52:38  
Local clock offset: -13.525 ms  
Remote clock offset: 4.143 ms

# Below is generated by plot.py at 2018-08-28 08:57:58  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 90.93 Mbit/s  
95th percentile per-packet one-way delay: 60.789 ms  
Loss rate: 0.49%  
-- Flow 1:  
Average throughput: 90.93 Mbit/s  
95th percentile per-packet one-way delay: 60.789 ms  
Loss rate: 0.49%

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



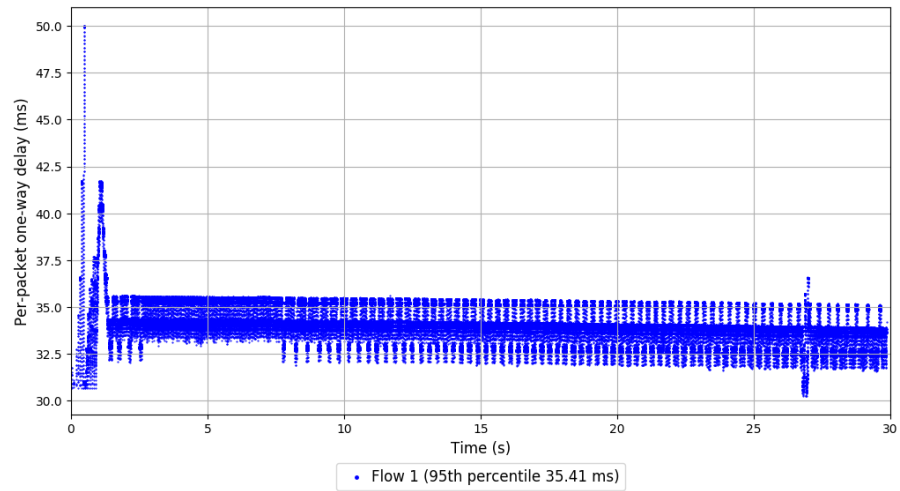
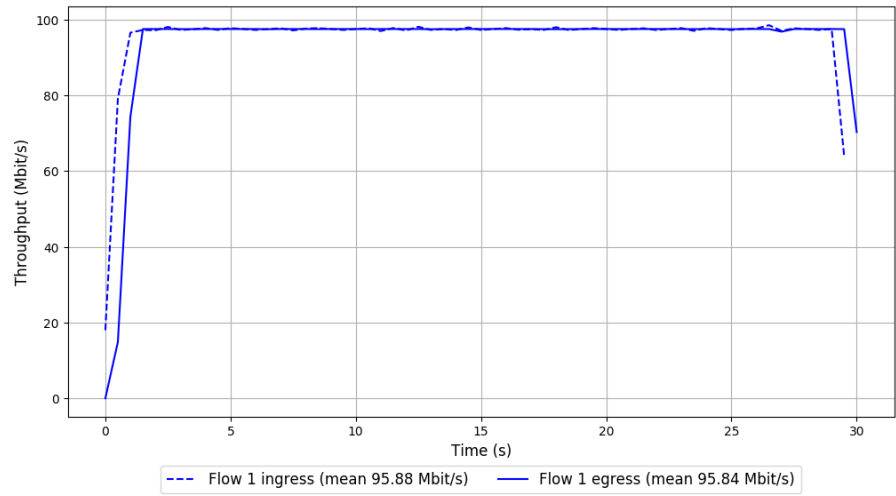
```
Run 1: Statistics of Indigo

Start at: 2018-08-28 08:43:02
End at: 2018-08-28 08:43:32
Local clock offset: -3.33 ms
Remote clock offset: 4.236 ms

# Below is generated by plot.py at 2018-08-28 08:57:58
# Datalink statistics
-- Total of 1 flow:
Average throughput: 95.84 Mbit/s
95th percentile per-packet one-way delay: 35.407 ms
Loss rate: 0.03%
-- Flow 1:
Average throughput: 95.84 Mbit/s
95th percentile per-packet one-way delay: 35.407 ms
Loss rate: 0.03%
```



## Run 1: Report of Indigo — Data Link



Run 2: Statistics of Indigo

Start at: 2018-08-28 08:48:14

End at: 2018-08-28 08:48:44

Local clock offset: -9.773 ms

Remote clock offset: 4.239 ms

# Below is generated by plot.py at 2018-08-28 08:57:58

# Datalink statistics

-- Total of 1 flow:

Average throughput: 95.75 Mbit/s

95th percentile per-packet one-way delay: 35.393 ms

Loss rate: 0.00%

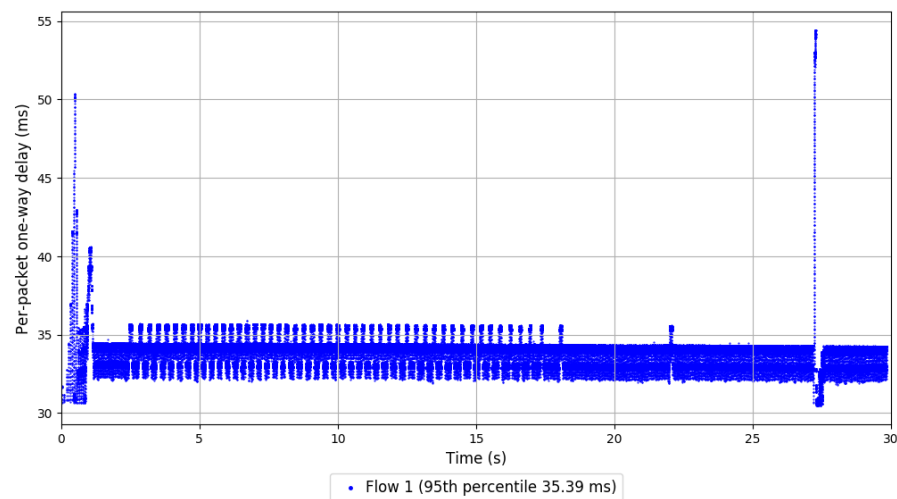
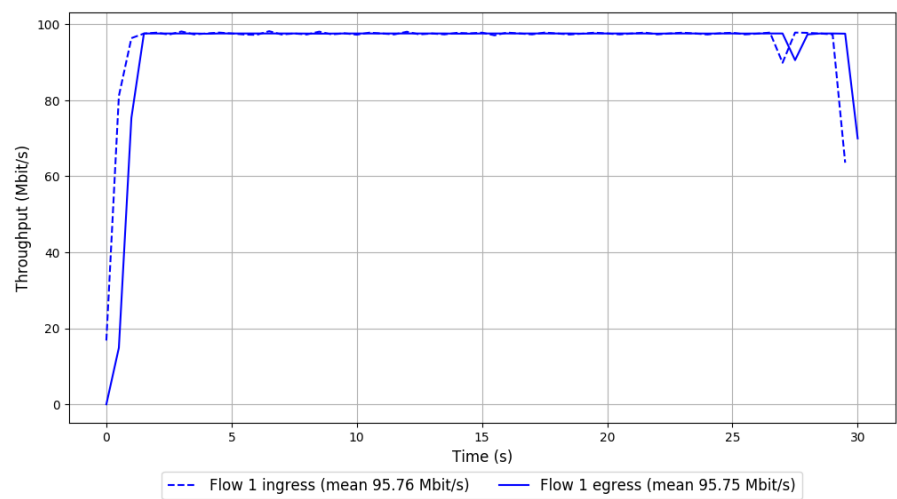
-- Flow 1:

Average throughput: 95.75 Mbit/s

95th percentile per-packet one-way delay: 35.393 ms

Loss rate: 0.00%

Run 2: Report of Indigo — Data Link

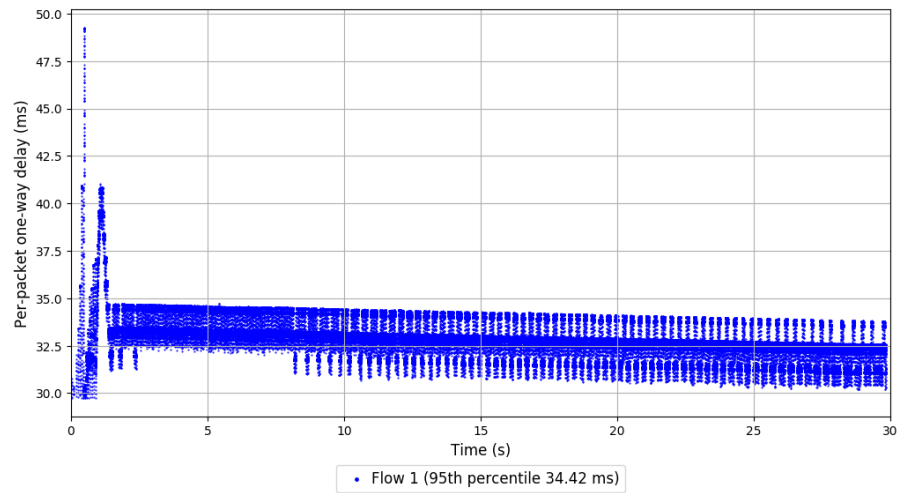
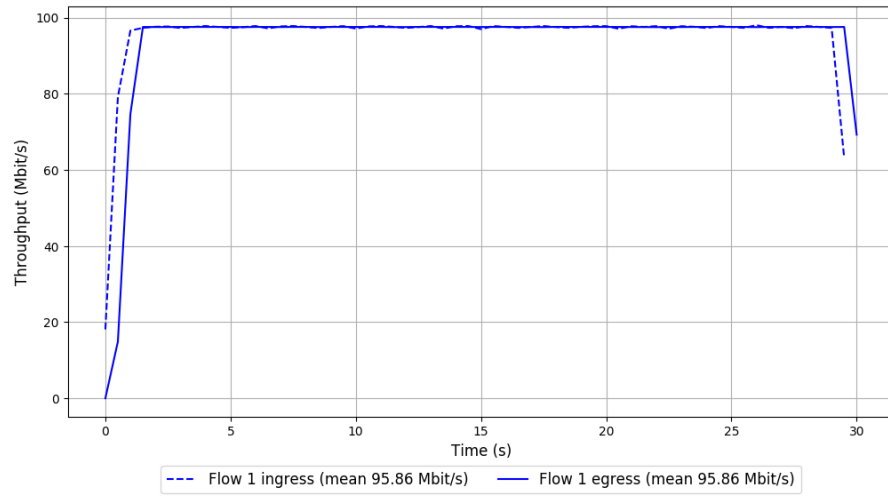


Run 3: Statistics of Indigo

Start at: 2018-08-28 08:53:26  
End at: 2018-08-28 08:53:56  
Local clock offset: -16.097 ms  
Remote clock offset: 4.12 ms

# Below is generated by plot.py at 2018-08-28 08:58:02  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 95.86 Mbit/s  
95th percentile per-packet one-way delay: 34.420 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 95.86 Mbit/s  
95th percentile per-packet one-way delay: 34.420 ms  
Loss rate: 0.00%

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



Run 1: Statistics of Muses-23

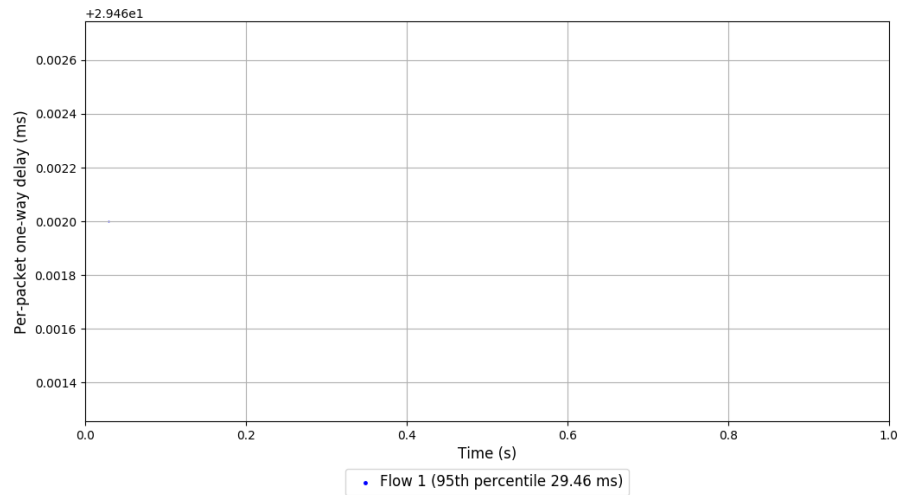
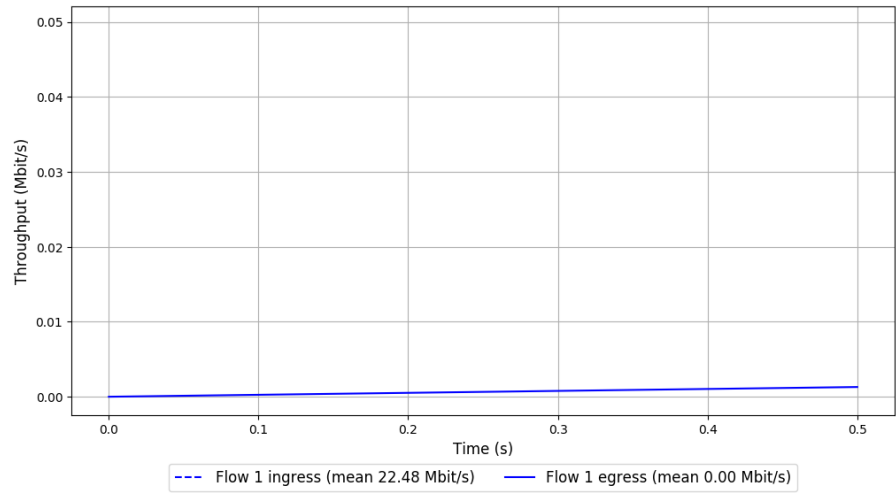
Start at: 2018-08-28 08:45:40

End at: 2018-08-28 08:46:10

Local clock offset: -7.023 ms

Remote clock offset: 4.248 ms

## Run 1: Report of Muses-23 — Data Link



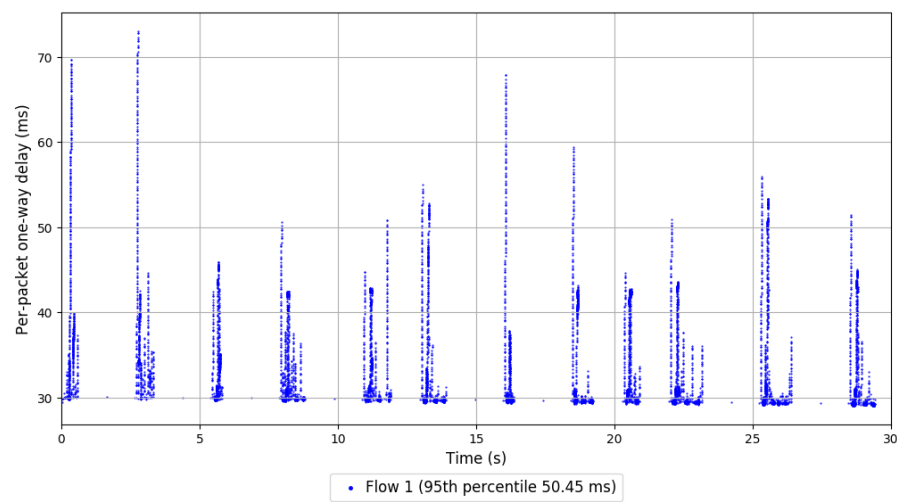
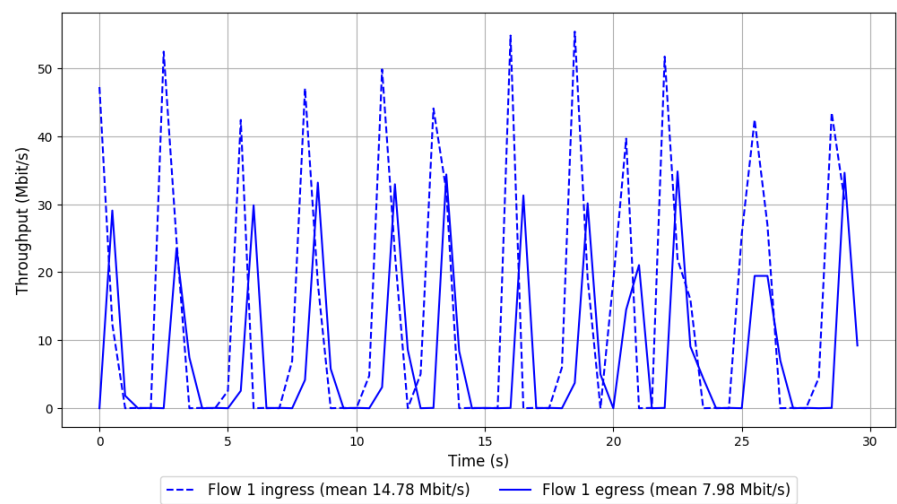
Run 2: Statistics of Muses-23

Start at: 2018-08-28 08:50:52  
End at: 2018-08-28 08:51:22  
Local clock offset: -11.472 ms  
Remote clock offset: 4.119 ms

# Below is generated by plot.py at 2018-08-28 08:58:02  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 7.98 Mbit/s  
95th percentile per-packet one-way delay: 50.453 ms  
Loss rate: 46.07%  
-- Flow 1:  
Average throughput: 7.98 Mbit/s  
95th percentile per-packet one-way delay: 50.453 ms  
Loss rate: 46.07%



Run 2: Report of Muses-23 — Data Link



Run 3: Statistics of Muses-23

Start at: 2018-08-28 08:56:05

End at: 2018-08-28 08:56:35

Local clock offset: -19.857 ms

Remote clock offset: 4.159 ms

Run 3: Report of Muses-23 — Data Link

