

## Pantheon Report

Generated at 2018-08-31 08:39:22 (UTC).

Data path: AWS Brazil 1 on `ens5` (*local*) → Brazil on `p4p1` (*remote*).

Repeated the test of 4 congestion control schemes 3 times.

Each test lasted for 30 seconds running 1 flow.

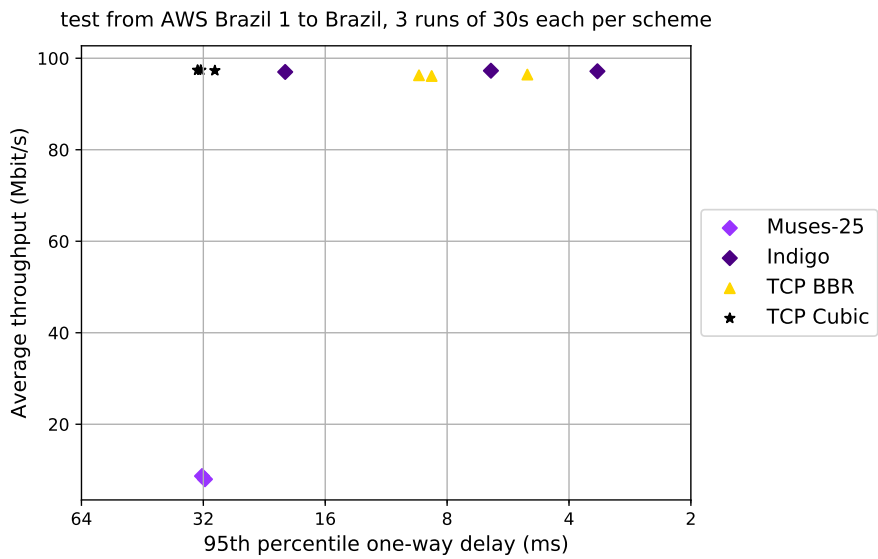
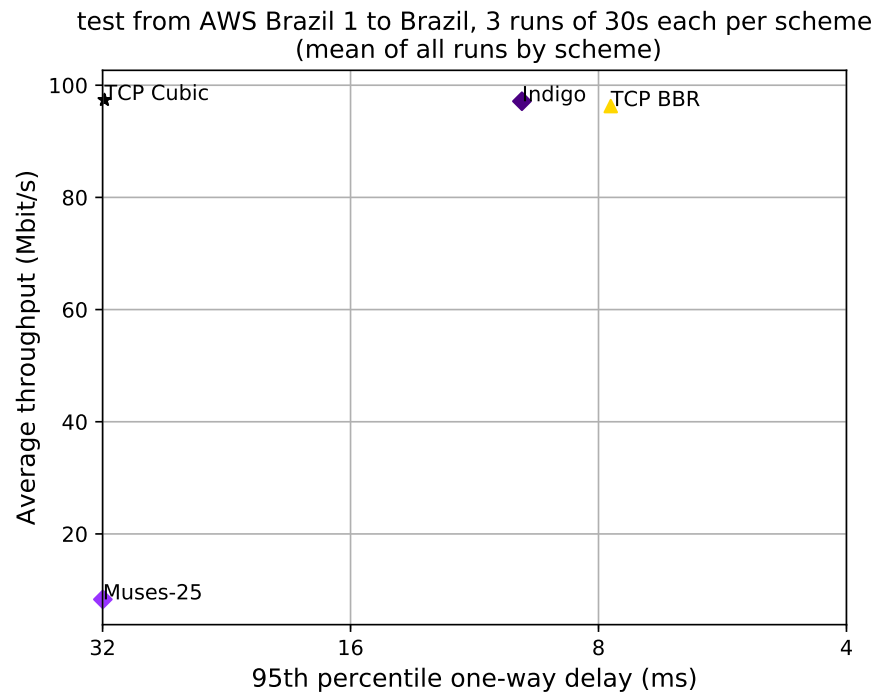
NTP offsets were measured against `gps.ntp.br` and have been applied to correct the timestamps in logs.

### 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
net.ipv4.tcp_mem = 536870912 536870912 536870912
```

### Git summary:

```
branch: muses @ e3c5aa19ca94c3066828fb83f16a8fb6b2731e7a
third_party/fillp @ d47f4fa1b454a5e3c0537115c5a28436dbd4b834
third_party/fillp-sheep @ daed0c84f98531712514b2231f43ec6901114ffe
third_party/genericCC @ d0153f8e594aa89e93b032143cedbdf58e562f4
third_party/indigo @ 2601c92e4aa9d58d38dc4dfe0ecd90c077e64d
third_party/libutp @ b3465b942e2826f2b179eaab4a906ce6bb7cf3cf
third_party/muses @ b59e0d118c50af3579569c462d33045741c85981
third_party/pantheon-tunnel @ cbfce6db5ff5740d4fe1771f813cd646339e1952
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
```



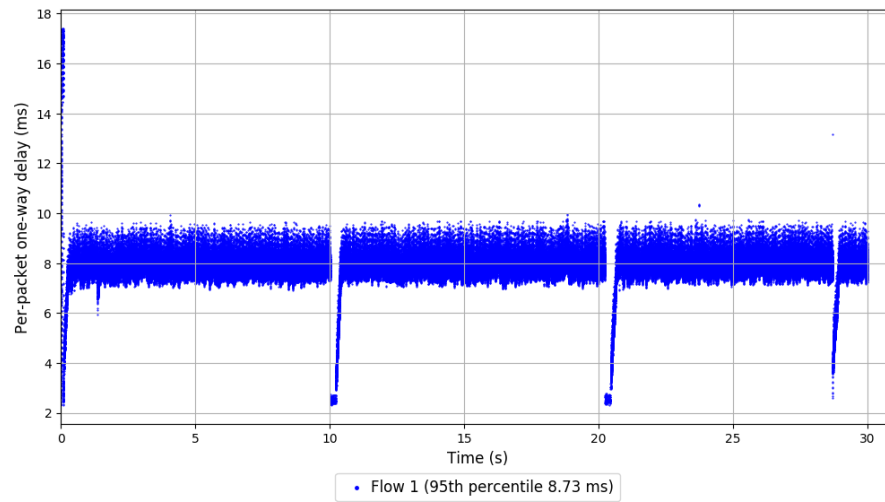
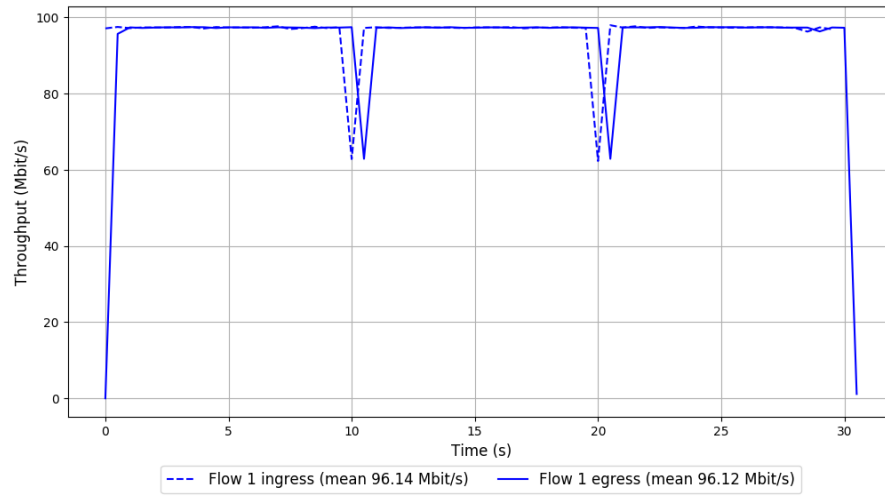
| scheme    | # runs | mean avg tput (Mbit/s)<br>flow 1 | mean 95th-%ile delay (ms)<br>flow 1 | mean loss rate (%)<br>flow 1 |
|-----------|--------|----------------------------------|-------------------------------------|------------------------------|
| TCP BBR   | 3      | 96.28                            | 7.73                                | 0.00                         |
| TCP Cubic | 3      | 97.37                            | 31.83                               | 0.01                         |
| Indigo    | 3      | 97.14                            | 9.91                                | 0.00                         |
| Muses-25  | 2      | 8.33                             | 31.97                               | 36.18                        |

Run 1: Statistics of TCP BBR

Start at: 2018-08-31 08:27:16  
End at: 2018-08-31 08:27:46  
Local clock offset: -4.976 ms  
Remote clock offset: -0.104 ms

# Below is generated by plot.py at 2018-08-31 08:39:11  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 96.12 Mbit/s  
95th percentile per-packet one-way delay: 8.735 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 96.12 Mbit/s  
95th percentile per-packet one-way delay: 8.735 ms  
Loss rate: 0.00%

# Run 1: Report of TCP BBR — Data Link

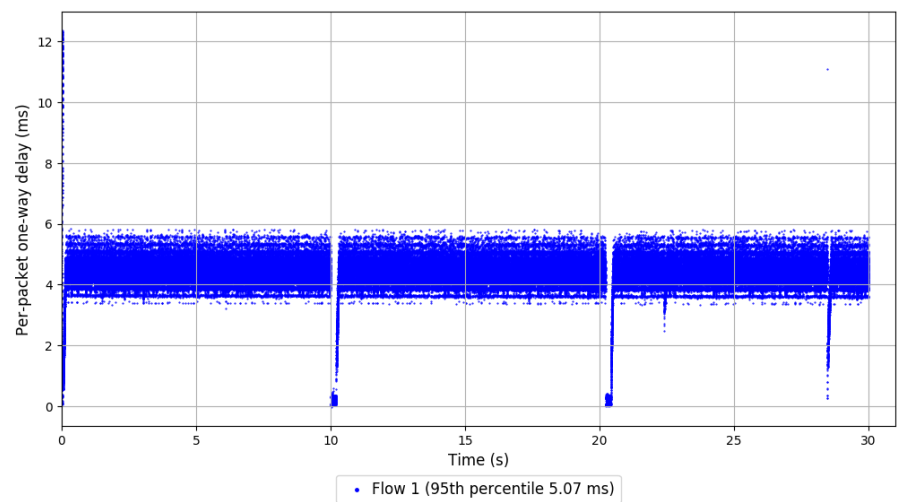
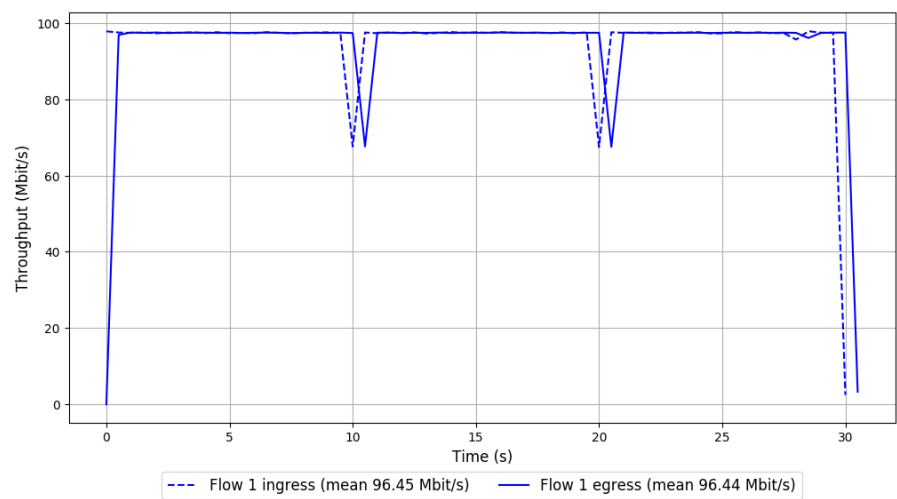


Run 2: Statistics of TCP BBR

Start at: 2018-08-31 08:31:43  
End at: 2018-08-31 08:32:13  
Local clock offset: -6.418 ms  
Remote clock offset: -0.011 ms

# Below is generated by plot.py at 2018-08-31 08:39:11  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 96.44 Mbit/s  
95th percentile per-packet one-way delay: 5.069 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 96.44 Mbit/s  
95th percentile per-packet one-way delay: 5.069 ms  
Loss rate: 0.00%

Run 2: Report of TCP BBR — Data Link



Run 3: Statistics of TCP BBR

Start at: 2018-08-31 08:36:09

End at: 2018-08-31 08:36:39

Local clock offset: -8.122 ms

Remote clock offset: 0.058 ms

# Below is generated by plot.py at 2018-08-31 08:39:12

# Datalink statistics

-- Total of 1 flow:

Average throughput: 96.28 Mbit/s

95th percentile per-packet one-way delay: 9.388 ms

Loss rate: 0.00%

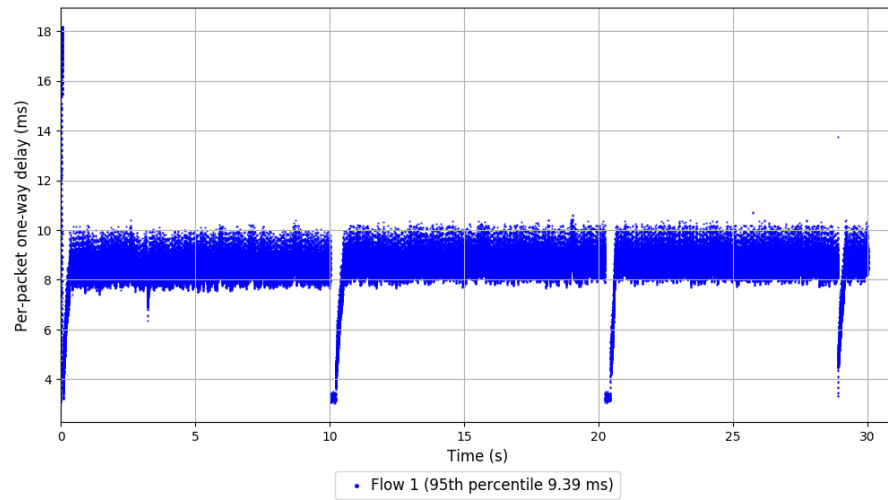
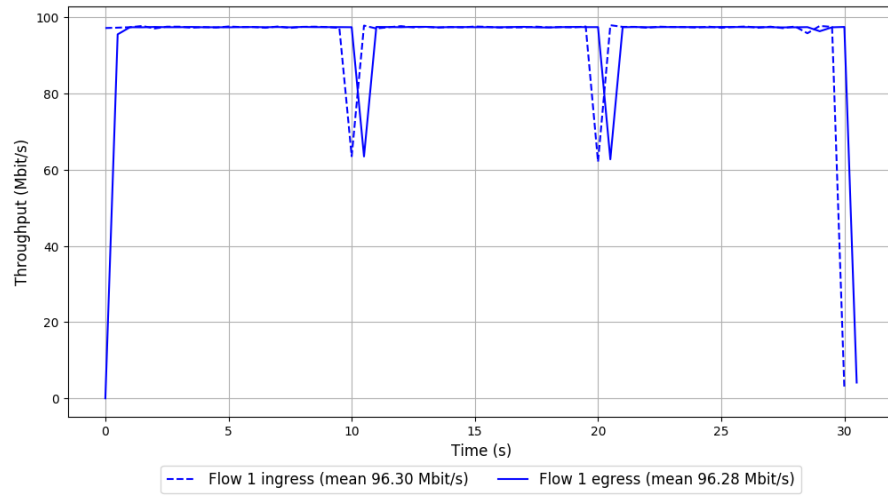
-- Flow 1:

Average throughput: 96.28 Mbit/s

95th percentile per-packet one-way delay: 9.388 ms

Loss rate: 0.00%

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

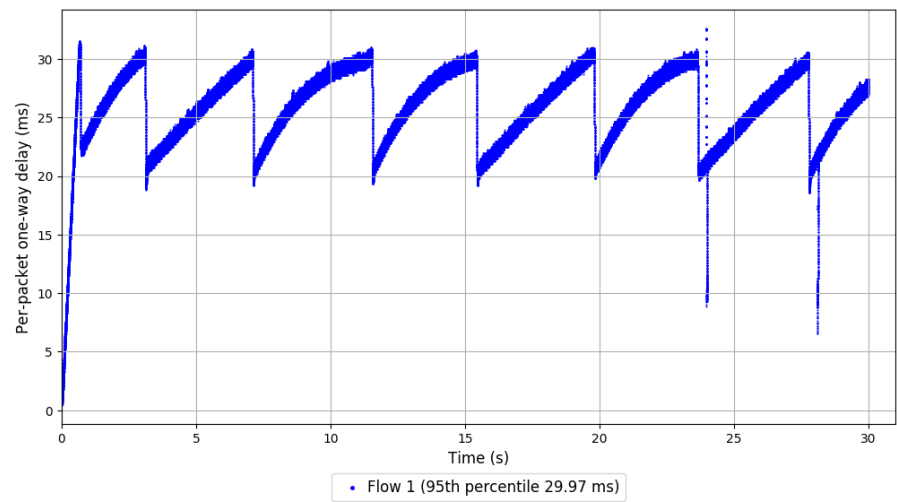
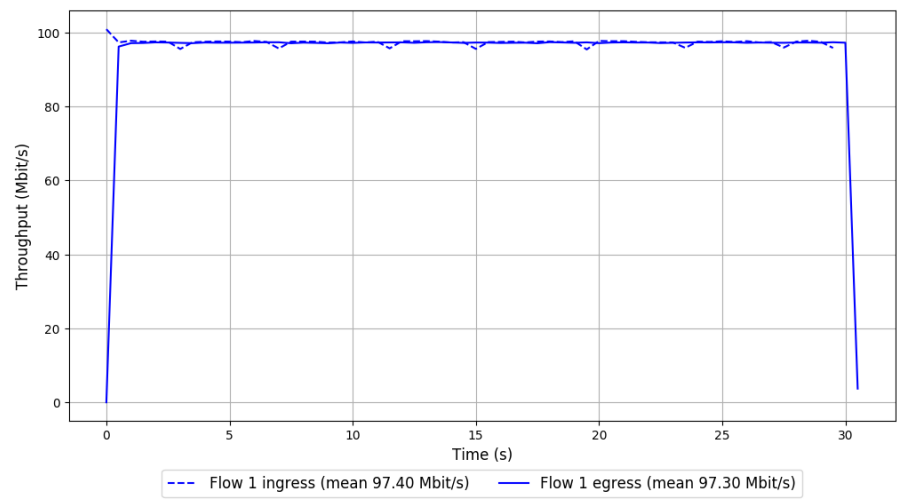


Run 1: Statistics of TCP Cubic

Start at: 2018-08-31 08:28:23  
End at: 2018-08-31 08:28:53  
Local clock offset: -5.534 ms  
Remote clock offset: -0.017 ms

# Below is generated by plot.py at 2018-08-31 08:39:13  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 97.30 Mbit/s  
95th percentile per-packet one-way delay: 29.971 ms  
Loss rate: 0.01%  
-- Flow 1:  
Average throughput: 97.30 Mbit/s  
95th percentile per-packet one-way delay: 29.971 ms  
Loss rate: 0.01%

Run 1: Report of TCP Cubic — Data Link

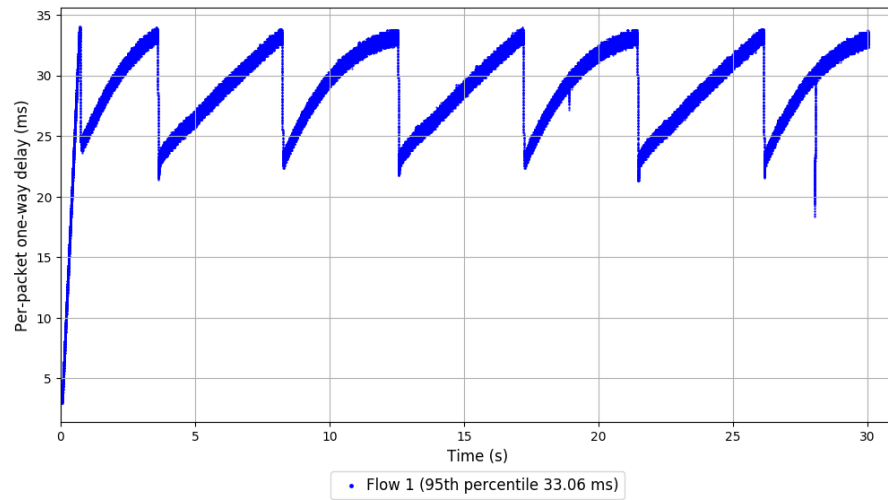
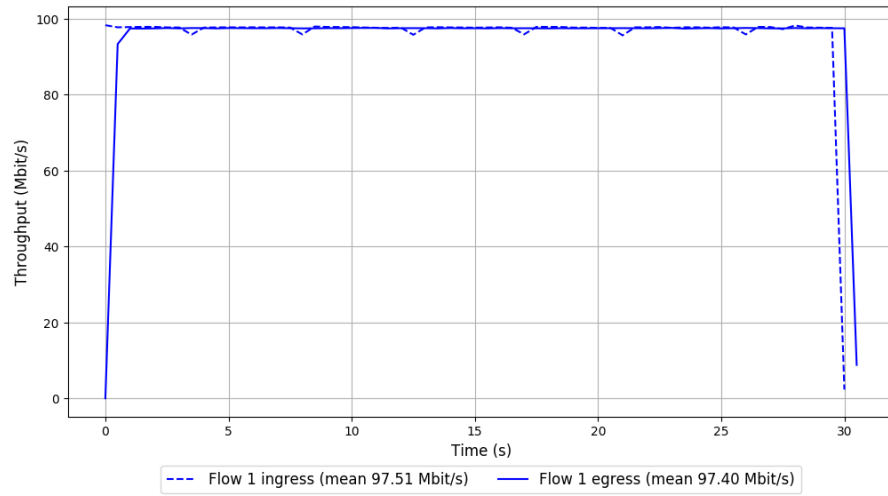


Run 2: Statistics of TCP Cubic

Start at: 2018-08-31 08:32:50  
End at: 2018-08-31 08:33:20  
Local clock offset: -8.019 ms  
Remote clock offset: -0.083 ms

# Below is generated by plot.py at 2018-08-31 08:39:14  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 97.40 Mbit/s  
95th percentile per-packet one-way delay: 33.064 ms  
Loss rate: 0.01%  
-- Flow 1:  
Average throughput: 97.40 Mbit/s  
95th percentile per-packet one-way delay: 33.064 ms  
Loss rate: 0.01%

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



Run 3: Statistics of TCP Cubic

Start at: 2018-08-31 08:37:16

End at: 2018-08-31 08:37:46

Local clock offset: -7.455 ms

Remote clock offset: 0.083 ms

# Below is generated by plot.py at 2018-08-31 08:39:15

# Datalink statistics

-- Total of 1 flow:

Average throughput: 97.41 Mbit/s

95th percentile per-packet one-way delay: 32.470 ms

Loss rate: 0.01%

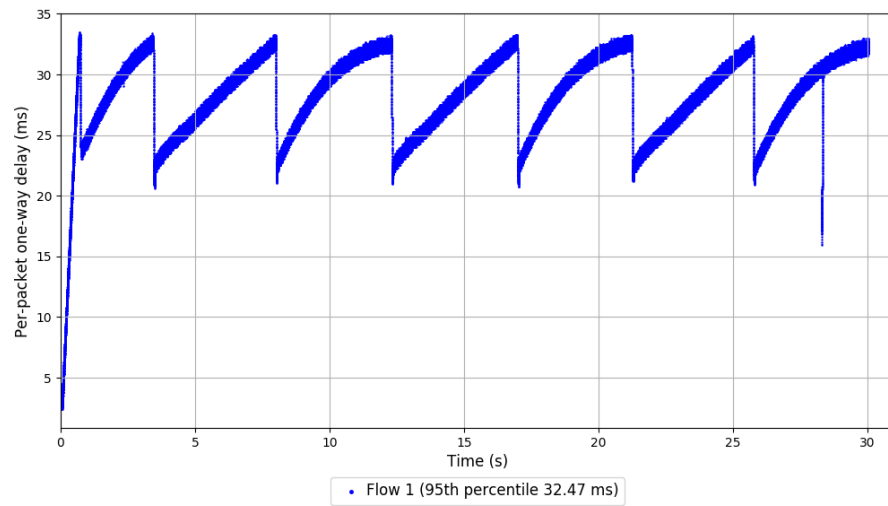
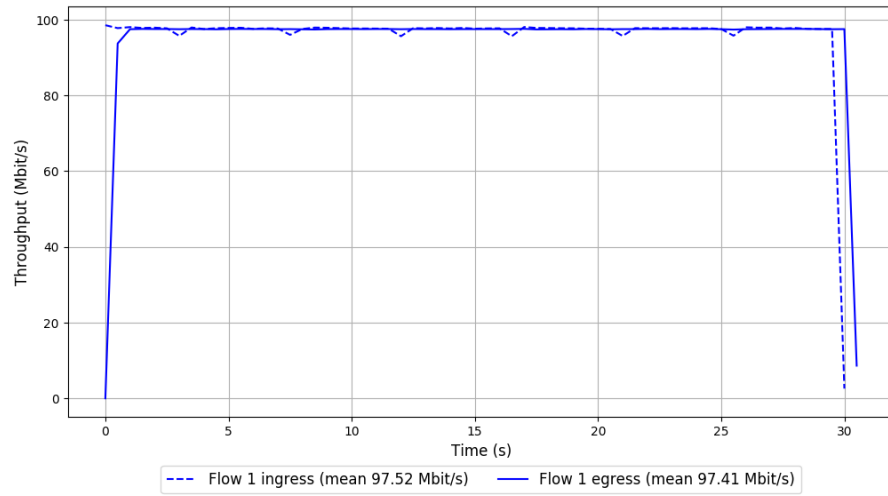
-- Flow 1:

Average throughput: 97.41 Mbit/s

95th percentile per-packet one-way delay: 32.470 ms

Loss rate: 0.01%

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

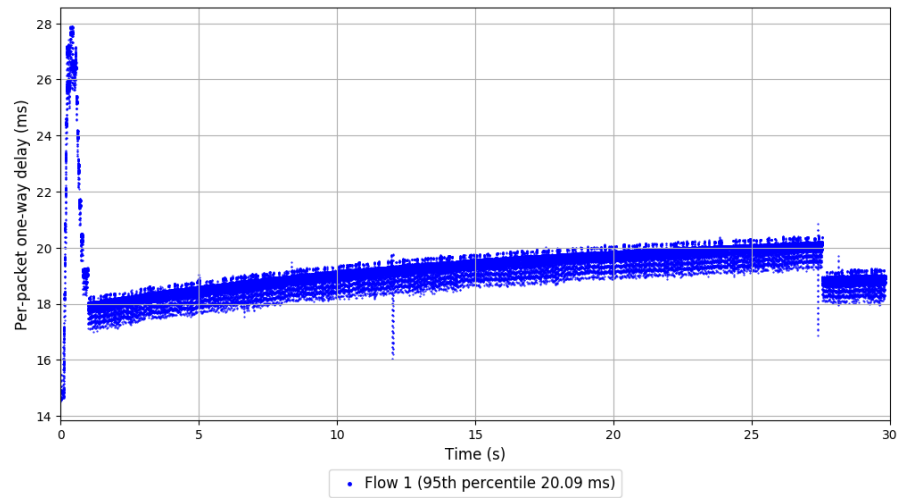
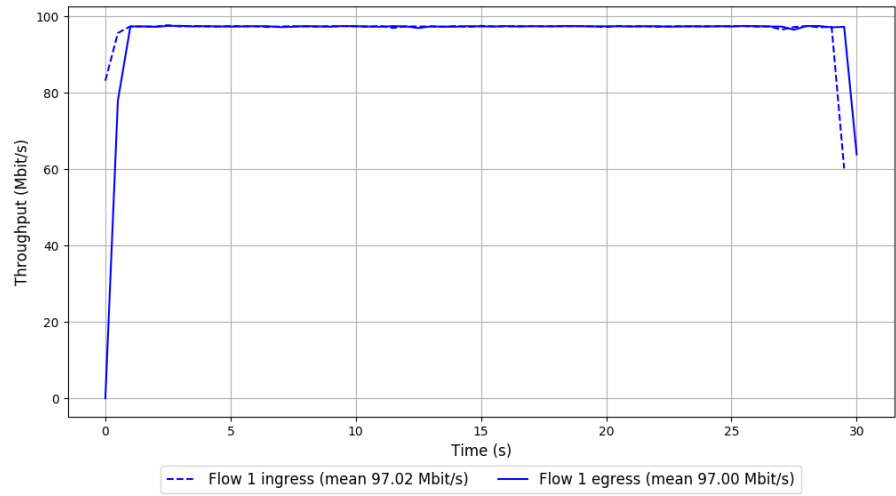


```
Run 1: Statistics of Indigo

Start at: 2018-08-31 08:25:04
End at: 2018-08-31 08:25:34
Local clock offset: -20.626 ms
Remote clock offset: 0.015 ms

# Below is generated by plot.py at 2018-08-31 08:39:15
# Datalink statistics
-- Total of 1 flow:
Average throughput: 97.00 Mbit/s
95th percentile per-packet one-way delay: 20.091 ms
Loss rate: 0.00%
-- Flow 1:
Average throughput: 97.00 Mbit/s
95th percentile per-packet one-way delay: 20.091 ms
Loss rate: 0.00%
```

## Run 1: Report of Indigo — Data Link

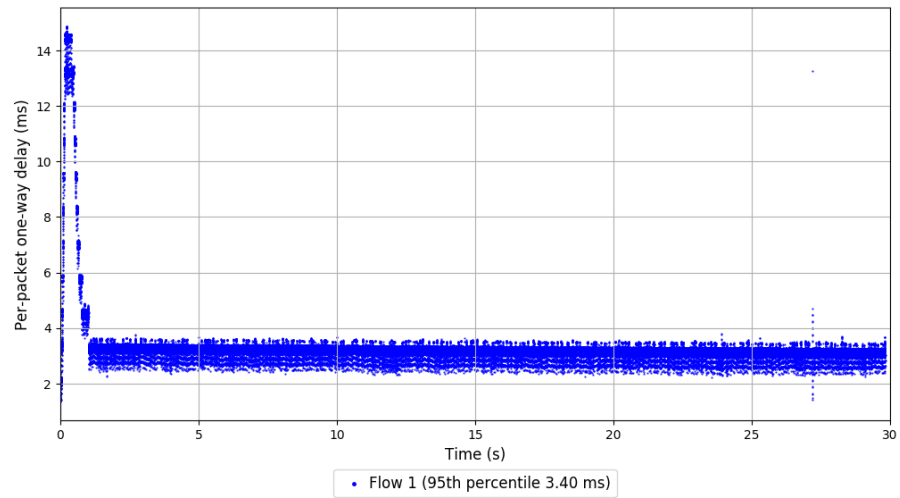
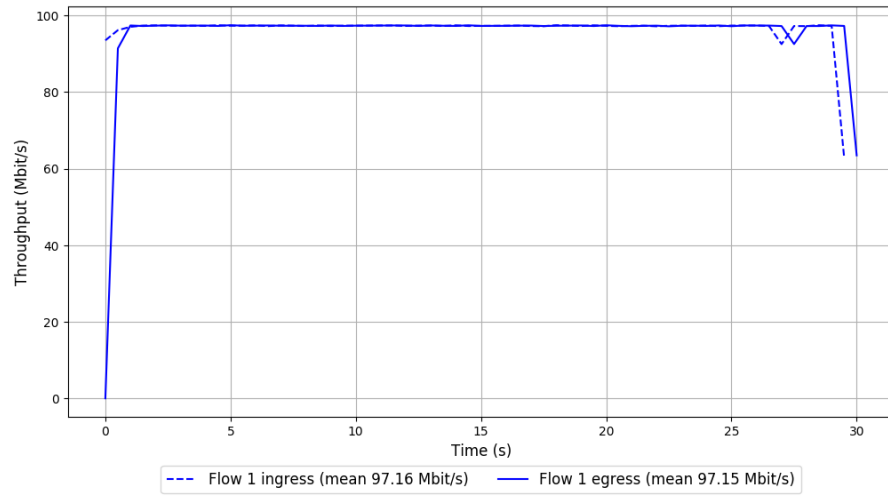


Run 2: Statistics of Indigo

Start at: 2018-08-31 08:29:31  
End at: 2018-08-31 08:30:01  
Local clock offset: -7.365 ms  
Remote clock offset: -0.049 ms

# Below is generated by plot.py at 2018-08-31 08:39:15  
# Datalink statistics  
-- Total of 1 flow:  
Average throughput: 97.15 Mbit/s  
95th percentile per-packet one-way delay: 3.403 ms  
Loss rate: 0.00%  
-- Flow 1:  
Average throughput: 97.15 Mbit/s  
95th percentile per-packet one-way delay: 3.403 ms  
Loss rate: 0.00%

## Run 2: Report of Indigo — Data Link



Run 3: Statistics of Indigo

Start at: 2018-08-31 08:33:57

End at: 2018-08-31 08:34:27

Local clock offset: -8.152 ms

Remote clock offset: 0.056 ms

# Below is generated by plot.py at 2018-08-31 08:39:20

# Datalink statistics

-- Total of 1 flow:

Average throughput: 97.27 Mbit/s

95th percentile per-packet one-way delay: 6.236 ms

Loss rate: 0.00%

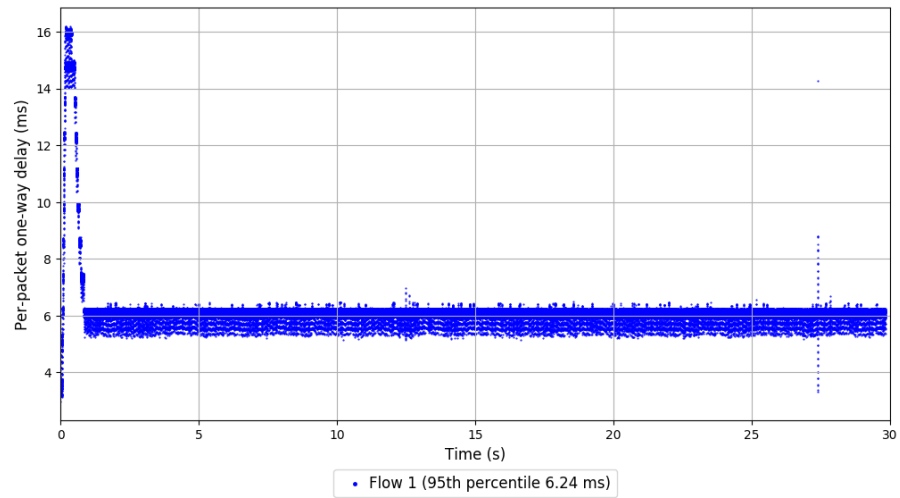
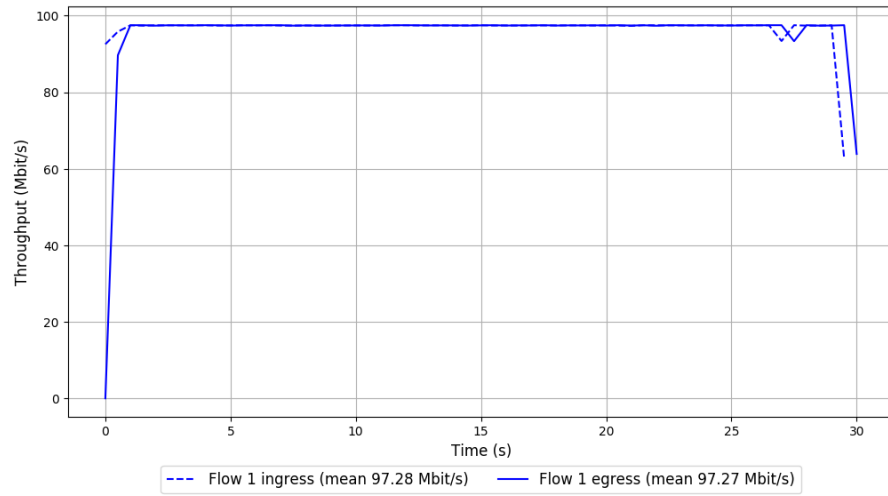
-- Flow 1:

Average throughput: 97.27 Mbit/s

95th percentile per-packet one-way delay: 6.236 ms

Loss rate: 0.00%

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



Run 1: Statistics of Muses-25

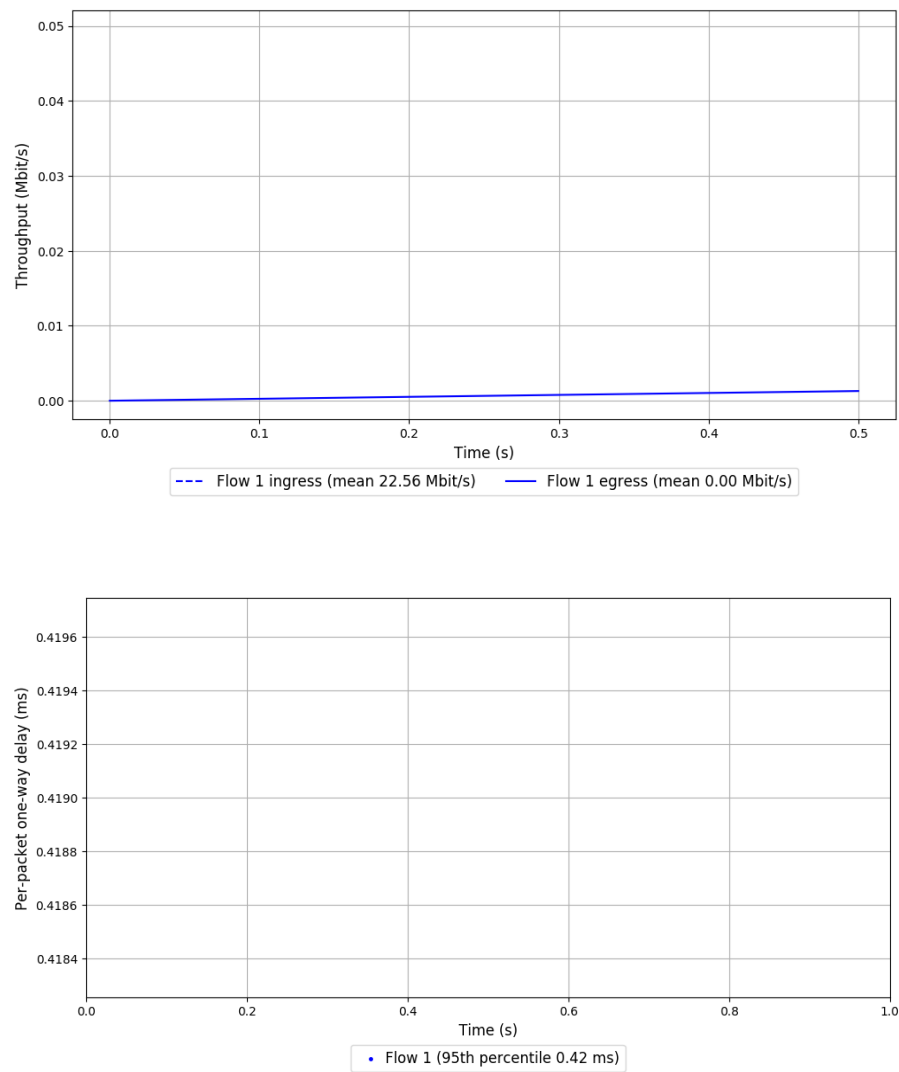
Start at: 2018-08-31 08:26:13

End at: 2018-08-31 08:26:43

Local clock offset: -4.695 ms

Remote clock offset: -0.042 ms

Run 1: Report of Muses-25 — Data Link



Run 2: Statistics of Muses-25

Start at: 2018-08-31 08:30:39

End at: 2018-08-31 08:31:09

Local clock offset: -7.821 ms

Remote clock offset: 0.028 ms

# Below is generated by plot.py at 2018-08-31 08:39:20

# Datalink statistics

-- Total of 1 flow:

Average throughput: 8.68 Mbit/s

95th percentile per-packet one-way delay: 32.239 ms

Loss rate: 33.55%

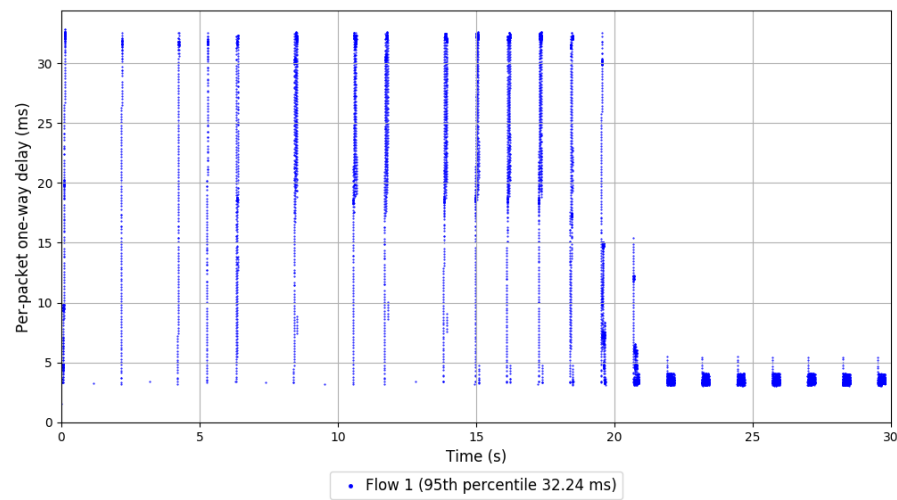
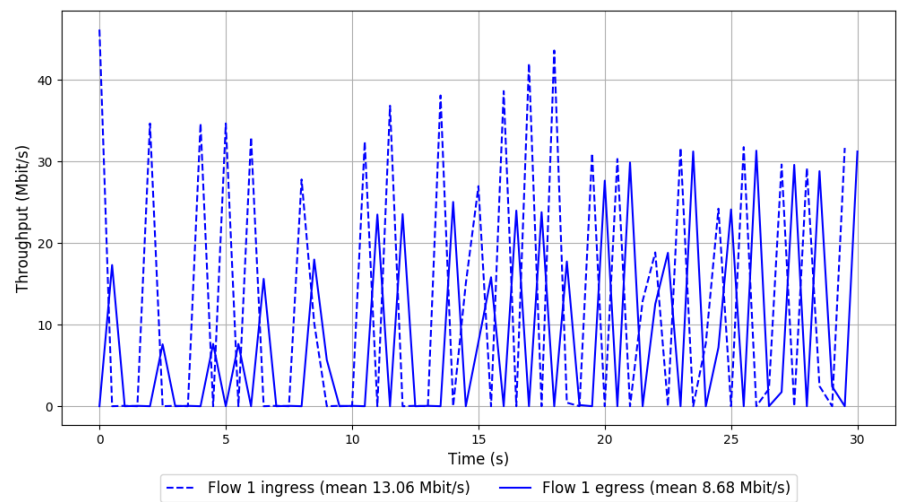
-- Flow 1:

Average throughput: 8.68 Mbit/s

95th percentile per-packet one-way delay: 32.239 ms

Loss rate: 33.55%

Run 2: Report of Muses-25 — Data Link



Run 3: Statistics of Muses-25

Start at: 2018-08-31 08:35:06

End at: 2018-08-31 08:35:36

Local clock offset: -7.338 ms

Remote clock offset: 0.068 ms

# Below is generated by plot.py at 2018-08-31 08:39:20

# Datalink statistics

-- Total of 1 flow:

Average throughput: 7.98 Mbit/s

95th percentile per-packet one-way delay: 31.709 ms

Loss rate: 38.81%

-- Flow 1:

Average throughput: 7.98 Mbit/s

95th percentile per-packet one-way delay: 31.709 ms

Loss rate: 38.81%

Run 3: Report of Muses-25 — Data Link

